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GAS REPORT
DEVOTED TO THE INTERESTS OF THE GAS INDUSTRY

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A GEM OF A FABLE

Once upon a time there was a small village. In this village there lived people much like you and I. It came to pass that one day the village millers fell to talking amongst themselves, wondering at great length wherein they might sell more flour to the bakers.

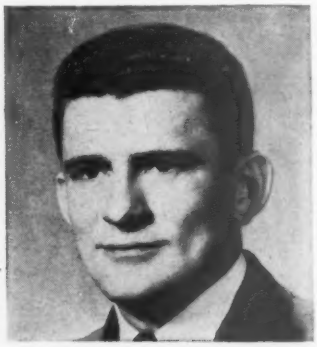
When the bakers were told of the millers' desires, they replied most logically that they could indeed buy not a dram more flour unless they could sell more bread. Whereupon many of the millers devoted but a little time, effort and coin to telling the populace the virtues of the bakers' products. Then all the populace did indeed consume more baked goods—then the bakers required more flour—then the millers, well, the millers lived happily ever after.

Moral: *In the gas business, too, both suppliers and utilities will benefit by "selling" gas to the consumer. Now is the time to earnestly support the Gas Equipment Manufacturers' program.*

ROCKWELL MANUFACTURING COMPANY
Pittsburgh 8, Pennsylvania

"LET'S EXAMINE SOME NEW METER STANDARDS!"

Lou McGowan, Chief Engineer, DuBois Division, Rockwell Manufacturing Co.



The gas mantle light is now just a dim memory. But, gas meters are still considered by many to require the same standards set when gas was sold almost solely for illumination. Applying out-dated standards, it is easy to see why modern gas meters seem "over rated." Certainly, today's aluminum gas meters operate at speeds in excess of "horse and buggy" meters, but the suggestion that they are overworked and will fail after comparatively short life demands a close examination of facts.

When gas meters were originally designed and manufactured in this country, they were intended for the measurement of manufactured gas. This gas was used almost exclusively for illumination. While the gas meters have changed very little in basic principles of design, the gas and the applications for the gas have changed tremendously. Water gas or coal gas used in those days was "dirty" and corrosive; modern natural gas is scrubbed and dried at several points on its journey from the well to the burner tip . . . it's a "clean" gas. So, the gas meter which at one time was required to have large diaphragms and heavy valves to overcome "dirty" gas conditions may now be replaced by lighter, smaller aluminum die-cast meters.

Determining Capacity

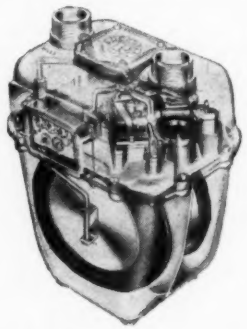
For example, let's consider the Rockwell #415 Meter. This meter is badged at a rated capacity of 415 feet. This means that at a difference of ½" water column pressure between inlet and outlet, the meter is passing 415 cubic feet of .6 specific gravity gas. The capacity of a meter is therefore a function of the differential pressure across the meter . . . *not* simply the speed at which the meter operates. Design-wise, the meter can be increased in capacity only by decreasing internal resistances to the flow of gas through the meter and by reducing parts friction. This may be accomplished in any or all of the following ways:

1. Diaphragms may be made lighter or more flexible.
2. Bearing points may be redesigned to decrease friction.
3. Resistance to gas flow may be improved by redesigning the flow channels through the meter . . . in particular, through the valve plate.

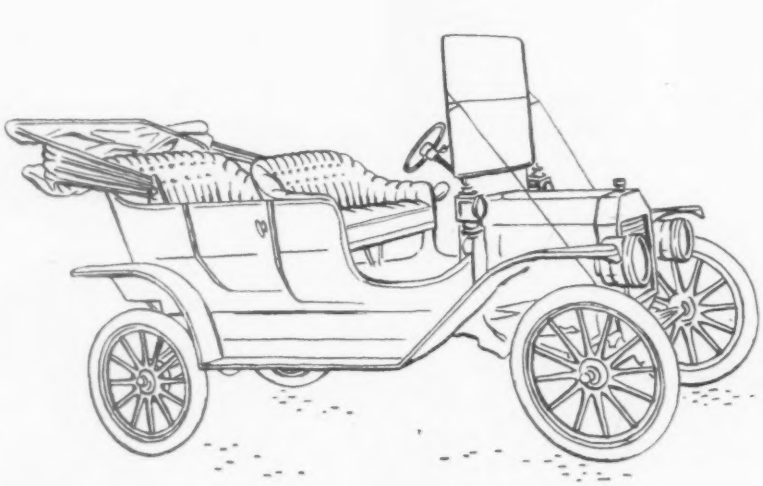
In discussing further these three possibilities for increasing gas meter capacities it should be pointed out immediately that the diaphragms have been tried and tested in their present design for many years. At this time, it is reasonable to assume that little improvement may be expected in diaphragm designs.

Bearing points have, in the newer meters, been changed to lubricated powdered bronze bearings. These new bearings have considerably reduced friction on bearing points and thereby increased gas meter capacity.

Perhaps the biggest factor in the increase of gas meter capacities is the improvement of the flow channels through the valve plate. In the newer meters, all obstacles and sharp points in the flow channels have either been removed or greatly streamlined. Ample area has been provided for smooth gas flow and the 270° turn at the outlet of the meter has been eliminated.



Modern meters employ powdered metal lubricated bearings to reduce friction on bearing surfaces and flow passages are as streamlined as a guided missile.



This 1902 Ford wasn't nearly so fast or efficient as the 1957 models are . . . the same idea applies to gas meters. It's little wonder that modern meters seem "over-worked" when based on 1902 standards.

Basis of Capacity

In discussing further the capacity and speed of meters, it is important that we examine the basis for capacity ratings. Domestic meters are generally considered as being meters of less than 450 cfh. This rating is based on ½" water column differential between the inlet and outlet of the meter. Industrial meters are those meters which have a capacity of greater than 450 cfh, or are rated on a differential pressure of 2" water column. At the time these ratings were established, it was felt that the ½" water column rating for domestic meters was the maximum efficient speed at which these meters could be operated. The reasoning was that above ½" water column ratings, excessive wear would be encountered in the white metal links and bearings. The big meters, or so-called industrial meters, were rated a 2" water column differential because it was felt that they were of heavier construction and were "beefed-up" to resist wear. The fact remains, however, that bearing points of smaller meters (and industrial meters, too) have been vastly improved and are now actually designed to withstand wear at higher operating differentials.

Meter Speed

The #415 Rockwell Meter, at its rated capacity, turns 2,700 revolutions per hour. This is approximately 45 revolutions per minute. To old time meter men this seems like a super-sonic speed. But the question is, "Why was the speed of 120 revolutions per hour for so long considered to be the maximum safe speed for gas meters?" The answer seems to be that such a speed represented the capacity operation of an original 5 Lt. Meter (30 cfh). The old meter which by virtue of its design —tiny valves, small gas ways, inefficient bearing, etc.—really had a maximum safe speed of only 120 revolutions per hour. However, it is virtually impossible to compare the old meter with the new meter and accept the old meter as a basic standard. The parallel which illustrates such a standard is the development of the motor car. One would never dream of condemning the engine speed of an automobile because it exceeds that of a design produced over thirty years ago! In addition, we must remember that the "fast" meter which we are talking about is still only turning a mere 45 revolutions per minute . . . very slow in comparison with a new 235 horsepower automobile engine which puts out many hundreds of rpm and uses *identical* bearing materials which are used in present day meters!

Capacity Operation

A final point in discussing modern meter capacity entails a simple dictionary approach to the word, "capacity" ... "maximum output" (Webster's). The fact is that the average gas meter operates only a very small portion of the time at its rated capacity. It is probably fair to estimate that the average hourly consumption of a normal domestic consumer is approximately 30 cfh . . . roughly 8% of capacity of the Rockwell #415 Meter . . . and that pressure loss is negligible.

It seems strange that while some technical people are building an earth satellite, others of us are still using gas light era standards of rating gas measurement devices.

NOISE ABATEMENT IN HIGH PRESSURE BALANCED VALVE REGULATORS

Joseph A. Pommersheim, Chief Engineer, Norwalk Division
Rockwell Manufacturing Company

On some installations of H.P.B.V. Regulators where noise becomes objectionable because of the location, a very easy remedy has been used. This applies particularly to the Rockwell Type 36-B center guided valve assembly, and is particularly effective on the six inch regulators. On experimental installations of this size, we have found that by installing a baffle plate on the valve stem just below the coupling, the noise has been eliminated entirely or reduced to a level no longer objectionable. The method of assembly is shown in Figure 1. The baffle plate we have improvised is a Rockwell Type 30 Pilot Regulator diaphragm plate with the center hole opened sufficiently to slip over the valve stem. A nut holds the plate in position against the coupling.

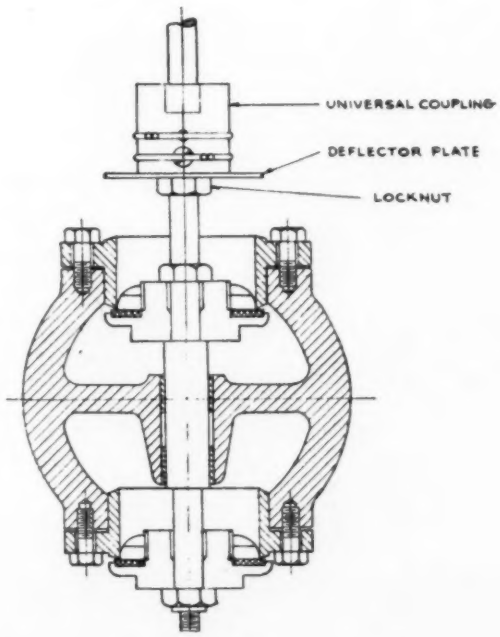


Figure 1

HOW TO SELECT VALVE LUBRICANTS

by R. J. Sarraf, Chief Chemical Engineer, Lubricant Engineering

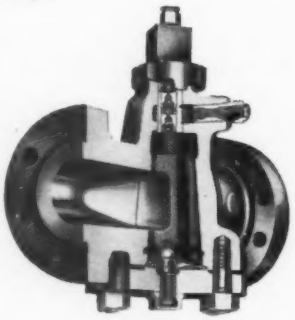
For more than forty years, the lubricated plug valve has been widely used throughout the gas industry. Although the original lubricated plug valve, invented by Sven Nordstrom, was designed for the mining industry, its principal use has been in gas transmission and distribution.

Before selecting lubricants for use in Rockwell-Nordstrom valves, it is well to understand the precise functions of the lubricant. The four prime functions of lubricants in a lubricated plug valve are:

1. To effect a plastic seal between the sliding contact surfaces of the valve which prevents leakage of the line fluid and prevents infiltration of foreign matter between these surfaces.
2. To furnish a fluid medium for lifting the plug from its seat, both to provide a space for the renewal of the lubricant film and to free the plug from its seat if corroded and frozen together.
3. To effect easy operation for the valve by lubricating the sliding contact surfaces and reducing the friction between them.
4. To provide a protection for these surfaces so that the original finish is not marred by corrosion and the turning effort increased, also it prevents the development of leakage due to corrosion of these contact surfaces.

The selection of a lubricated valve for a desired service or class of services should not only involve the consideration of proper valve size, type, and metal construction capable of withstanding the temperature, pressure, corrosiveness, etc., but equal consideration must be given to a suitable lubricant for the particular service for which the valve is to be used. This is a prime requisite, since to obtain optimum operation, the valve structure and plastic sealing film must be considered an integrated unit. In a valve properly adjusted and lubricated with an effective lubricant, the lubricant becomes a structural part of the valve providing:

1. A flexible and renewable seat, thus eliminating the necessity for "force fits" and metal-to-metal contact to effect a seal.
2. A plastic film capable of coating internal valve parts for prevention of galling or seizing, and easing valve operation.



3. The hydraulic jacking force required to raise the plug for facilitating injection of lubricant into the valve.
4. Provision of a coating, protective in nature to the inner valve metal surfaces in contact with line fluid.
5. Other benefits attendant with the use of the Rockwell-Nordstrom lubricated tapered plug valve.

While we call our sealants lubricants their function in a valve is not the same as an ordinary lubricant used to lubricate a bushing or bearing in "high speed" applications.

Sealant used in lubricated valves not only has to lubricate, but also is subject to the solvent power and washing action of the line fluid. In addition, it must operate in abnormally high, or sub-zero temperatures encountered in industrial processing. Thus, in addition to providing the desired viscosity, metal-adhesion, thermal resistance and lubricity, these properties must be maintained in the presence of line fluid. These requirements are exacting since the volume of line fluid may be millions of times the volume of lubricant in contact with it.

As an illustration, Rockwell-Nordstrom lubricants are currently available which adequately function over the complete range of ¼" to 36" Rockwell-Nordstrom valve sizes, and up to the extreme of 15,000 psig working pressure or conversely, in ultra-high vacuum services of 3-5 MICRONS and lower. (1 micron of mercury (32°F) = 1.316×10^{-6} atmospheres.) This means the lubricants selected for these services must have extremely high film strength, low volatility and exceptional lubricating and sealing properties.

Temperature-wise, Rockwell-Nordstrom lubricants are available for service over a range of −150° to 1000° F. The noteworthy characteristics of these lubricants compounded for high temperature service include not only their ability to lubricate and seal under these extreme conditions of temperature, but particularly the fact that they do so without the formation of hard, carbonaceous residues, so often the case with lubricants improperly compounded or selected for high temperature service.

A complete manual on the selection of Rockwell-Nordstrom valve lubricants (including servicing and adjustment of valves) is available. If you would like a copy for your reference files, write: Rockwell Manufacturing Company, Pittsburgh 8, Pa.

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Modern Instruments for Test Laboratory Use

S. A. Weil, *Supervisor*
Combustion Research
Institute of Gas Technology
Chicago, Illinois

STRIKING advances have been made in instrumentation in the field of gas analysis. It is possible that these advances stand out because use of the older chemical methods of analysis is current or within our memory. This is particularly true for the analysis of fuel, burner head, and flue gases. In the past, such analyses have relied on chemical methods such as Orsat type analysis, physical processes, such as distillation, or on expensive instruments not always available, such as the mass spectrometer.

In this short presentation a few of the relatively newly developed instruments that should be useful in appliance testing and gas utility laboratories are discussed. These include the gas chromatograph, paramagnetic oxygen analyzer, infra-red carbon monoxide analyzer, and thermal conductivity carbon dioxide analyzer. The principles of operation of each will be described along with advantages possessed over the classical or manual analytical methods.

Gas Chromatograph

In utilization problems, one is invariably interested in determining the amount of one or all components in a gaseous mixture. The classical method of analysis is by separation and identification. In recent years, a method of fractionation has been developed that has, in principle, much greater power of separation than classical distillation procedures. Gas or vapor chromatography is enjoying wide use for the analysis of complex mixtures, and has been called "the poor man's mass spectrometer."

Theory. In chromatography, use is made of equilibria between gas or vapor and a condensed phase that may consist of material adsorbed on a solid surface or dissolved in a non-volatile liquid. In separation by fractional distillation, the vapor-liquid equilibrium composition is the determining factor and the number of equilibrium contacts is the major variable. In chromatography the nature of the condensed phase can be tailored to suit the particular mixture under analysis and obtain optimum separability.

The fractionation occurs in a "column," not necessarily straight, packed with the adsorbing or absorbing material. If the condensed phase is to consist of the solution of the gases in a non-volatile liquid, the packing consists of a granulated solid base coated with the liquid. As in the packed columns used in distillation, the large surface area existing in the chromatograph column results in a large number of equivalent plates, or condensed phase-vapor equilibrium contacts.

Because of its dependence on gravity flow, there are severe practical limitations to the distillation column height. In the gas chromatograph, Fig. 1, the material is transported by the flow of a carrier gas, and the separation is independent of shape or orientation of the column. Through the use of coiled columns, extreme lengths may be used with reasonable space requirements.

The sample to be analyzed is introduced into the carrier stream in such a manner as to minimize dilution until the gases reach the column. Within the column, the components are separated as a result of preferential adsorption so that the least adsorbed or soluble material moves most rapidly.

According to the purpose of operation, the effluent material may be collected for identification, or if its identity is known, passed through a cell for measurement of some physical property, such as its thermal conductivity. If further separation is required the effluent may be passed into a second column packed with a different material. A valving system can be employed to permit a choice of columns, as long as the operation of the valves does not effect the conditions within the column.

Helium is most often used for the carrier gas, because its physical properties are usually radically different from the gas analyzed. However, any inert gas may be used if it does not interfere with the components of particular interest.

Operation. If the condensed phase is solution in an inert liquid distributed on the packing, the separation of a hydrocarbon mixture will be in accordance with the vapor pressure of the components, i.e., that with the highest vapor pressure will pass through first. If the packing is a chemically active material, the separation will be in accordance with the chemical affinity between the sample gases and the packing.

For example, the separation of a

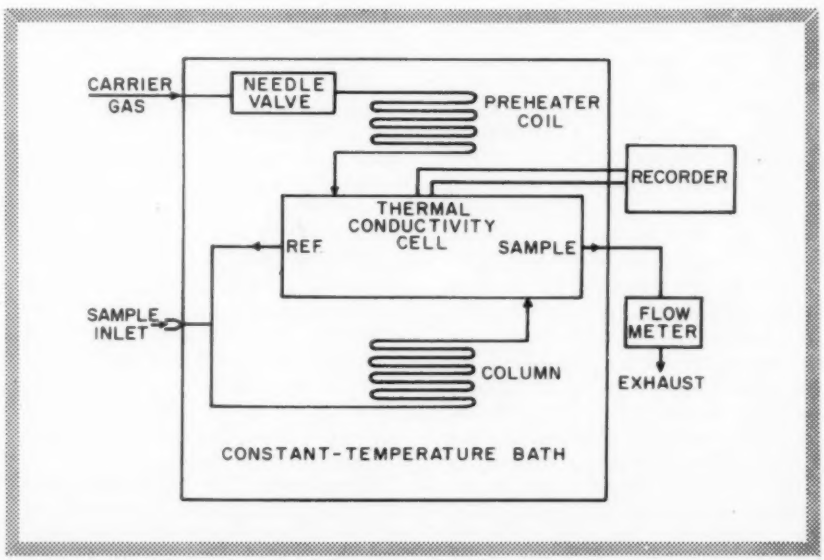

FIG. 1. Schematic diagram of a gas chromatograph.

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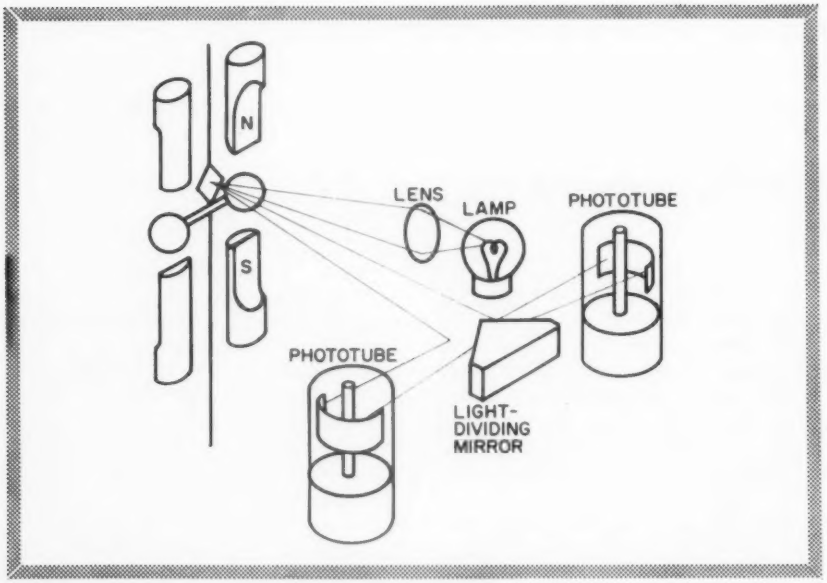

FIG. 2. Detection unit of paramagnetic oxygen analyzer.

paraffin and olefin may be poor if based on vapor pressure. If the active surface is a glycol containing silver nitrate, the formation of a metal-olefin complex will hold the olefin on the column without affecting the paraffins. It is obvious that the potential separations based on the choice of packing is tremendous. To use that potential, however, requires painstaking empirical evaluation of possible packing materials. In general, analytical laboratory personnel with a "knack" for picking the right material is almost as important as the instrument. For the laboratory involved in more routine analysis, two or three columns may suffice.

The limitations of gas chromatography are of a nature that can be reduced to any desired degree through careful control and calibration. With modifications, it has been demonstrated, these units can detect and measure impurities of the order of a few parts per million. Temperature, pressure, and flow rate should be steady and reproducible. Non-linearity of the physical property measured (usually thermal conductivity) with respect to concentration, requires a carefully constructed calibration curve.

If, as is often the case, due to time factors, not all of the sample is analyzed during a given run, sample volume must be known accurately. In principle, chromatographic methods should be capable of solving any gas analytical problem of interest to the utility industry whether it is an analysis of the fuel, burner head gases, or flue products. However, to discover the best packing for the more difficult problems may require an expensive investigation.

Paramagnetic Oxygen Analyzer

For the problem of continuous analysis of a gas stream for a particular component, instruments have been developed which are not based on the classical concept of analysis by separation, but rather on the measurement of a physical property of the system. The physical property to be measured is so chosen that the component of interest determines the value obtained. One such instrument is used for measuring the percentage oxygen in a gas sample.

Theory. The instrument in use at IGT is based on the phenomena that, of the gases usually encountered, only oxygen shows significant paramagnetic behavior. That is, oxygen will be attracted toward a magnetic field whereas most of the other gases that will be present such as hydrocarbons, nitrogen and carbon dioxide, will be repelled by the field.

Thus, if a body is suspended between two poles of a magnetic circuit, and a gas containing oxygen is introduced into the same area, the oxygen will tend to displace the body originally present (Fig. 2). This displacement can be measured in a manner similar to that used in the ballistic galvanometer. A mirror attached to the suspended body is also displaced thereby shifting the reflection of a stationary light beam. This shift in the reflected light can be detected by light sensitive electronic tubes, and converted into an electric current to be used in a potentiometer for amplification and recording.

Operation. The interference of any other gases present is usually small except in zeroing-in the instrument where one must use an inert gas. Actually, any material used as an inert gas will tend to record a negative oxygen concentration, a fact that must be taken into consideration. For calibration, air can be used as a source of oxygen. If, however, as is usually the case, calibration is desired over the range from about 10 to 20 percent oxygen, it may be necessary to maintain several standards to sufficiently characterize the whole range.

It is important to remember that, within the gas sample itself, the instrument reacts to the total amount of oxygen and not to the fraction of the oxygen. Therefore, pressure and temperature must be included in the calculation of the percentage oxygen unless the calibration is carried out at the same pressure and temperature as the actual measurement.

As in all of these instruments, the cell proper is usually thermostatically controlled, and, therefore, if the correct flow rates are used the temperature is automatically maintained. However, pressure considerations can be extremely significant as a result of the variation in barometric pressure during a day's use of the instrument.

The utilization of the oxygen analyzer in the analysis of burner-head gases, where one wishes to use it to determine the primary aeration of a burner, requires great precision, particularly in the case of higher molecular weight fuels near 100 percent primary aeration. The accuracy improves tremendously for mixtures that are extremely fuel rich, and conversely decreases quite significantly as the stoichiometric or theoretical mixture is approached.

It has been our experience that the instrument is very useful in studying the behavior of burners when natural gas is used as a fuel. In the evaluation of a burner with respect to the substitution of butane-air for natural gas, however, the range of flame stability is small.

The accuracy of the instrument imposes severe limitations on the definition of the range of operation with *butane-air*. With regard to this limitation, one should not lose sight of the fact that a chemical method of analysis would be more severely limited because the precision would be significantly less. Thus, an Orsat set-up for laboratory use has a precision about half that of the instrument methods and therefore, all the above inaccuracies would be about twice as great.

Unlike the Orsat method and in common with all instruments of this general nature, the possibility of zero-drift is present. Extensive use between zero and calibration checks is hazardous unless the drift in the particular instrument has been shown to be negligible.

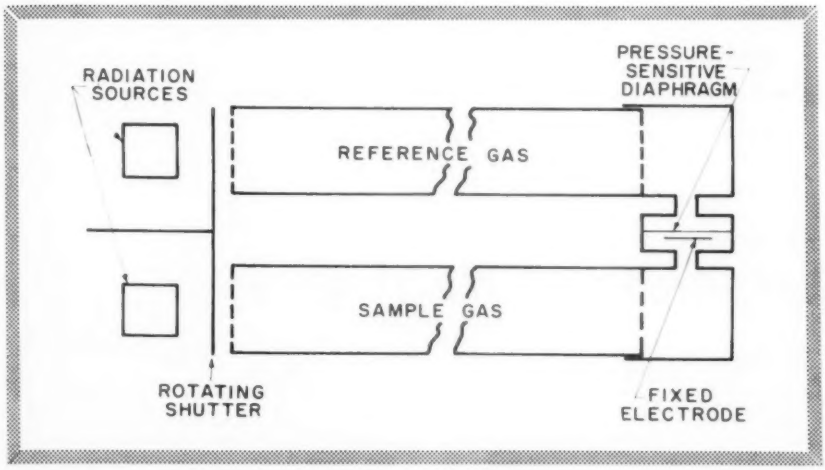

FIG. 3. Detection unit of infra-red carbon monoxide analyzer.

Infra-Red Carbon Monoxide Analyzer

Another relatively new instrument is used for the determination of carbon monoxide in flue gas samples. This instrument relies on the unique relationship between any substance and the wavelength of radiation it is capable of absorbing.

Theory. Infra-red radiation passed through the unknown gas mixture can be compared with that passed through a standard sample, and the difference in transmitted energy is an indication of the amount of any species peculiar to the unknown sample. The most complete infra-red analyzers control the wavelength of light to be used by means of a complicated optical system. For the purposes of the practicing engineer interested in a particular gas, it is simpler to use a detecting device that reacts to only the wavelengths of interest.

In the unit used at IGT, Fig. 3, the detection unit consists of two cells containing carbon monoxide separated by a diaphragm and each will absorb radiation peculiar to carbon monoxide. If the radiation reaching one cell has already passed through a sample containing carbon monoxide, that cell will absorb less energy than the other. The difference in absorbed energies causes different temperature rises and gas expansions thereby displacing the diaphragm. This displacement is converted to an electrical effect to be amplified and used as a measure of the carbon monoxide content in the unknown sample. It is apparent that, in principle, this means of measurement can be used for any gas by use of that gas in the detection cells.

Operation. Carbon dioxide tends to interfere with the reading of an infra-red carbon monoxide analyzer. However, if the gases being analyzed have a composition in the range usually encountered in flue products, the interference will be sufficiently small that it will not void any conclusions based relative to the 0.04 percent carbon monoxide content limitation imposed by many ASA requirements.

The instrument has a range of zero to 0.1 percent carbon monoxide, adequate if the gases are being sampled before significant dilution with air occurs. However, in those cases where this is not possible, there is a large dilution factor which one must take into consideration in calculating the percent carbon monoxide on an air-free basis.

It is often possible to have a result under these conditions that has a large degree of uncertainty. This problem, of course, exists regardless of the method of measurement, and therefore, the conveniences of the instrumental method over the chemical method still exist. It must be remembered to determine this dilution factor, either the oxygen or the carbon dioxide of the flue gas must also be determined simultaneously with the CO analysis.

Thermal Conductivity Carbon Dioxide Analyzer

The carbon dioxide analyzer is of great utility in combustion work. Many models of this analyzer have been based on thermal conductivity measurement and probably most gas utilization engineers have had some experience with them, particularly in flue gas analysis.

Theory. The operation of these analyzers depends upon the large difference in thermal conductivity between carbon dioxide and the other components usually present in flue gas samples. When all of the components in the mixture but carbon dioxide have practically the same conductivity, analysis can be made by determining the difference between the conductivity of the unknown mixture and that for a known mixture. For example, most flue gas components have a thermal conductivity near that of air, except for carbon dioxide, which has a significantly lower value. The system may then be treated as having two components and the output of conventional "bridge" circuits can be calibrated directly in percent carbon dioxide.

Hydrogen is a component which will significantly affect the conductivity of a mixture since its conductivity is considerably greater than that of most gases. A carbon dioxide analyzer can be recalibrated for use for hydrogen-air mixtures if bridge polarities are reversed. However, if both CO_2 and H_2 are present with air components, analyzer readings will have little significance.

Operation. The care necessary in calibration depends primarily on the use of the instrument. The carbon dioxide analyzer used at IGT has a precision of approximately 0.1 percent CO_2. Similar accuracy is available if the instrument is used to determine hydrogen content. This is comparable to the precision obtainable in a carefully constructed and operated laboratory type Orsat apparatus.

From this viewpoint, the major utility of an instrumental method of measuring CO_2 is the ease of obtaining and the immediacy of the results. Unlike the Orsat apparatus, the carbon dioxide analyzer can, with proper calibrations, be used to read comparatively small quantities of CO_2. The major modification required is the replacement of the standard potentiometer recording system with a more sensitive potentiometer.

The care required in calibration, control of flow rate of sample, and other conditions that might be ambient during normal operation becomes extreme when very small quantities are to be measured with accuracy. With respect to the usual application of the CO_2 analyzer, however, it has been found that the calibration is sufficiently stable and the results sufficiently reproducible for most work in the gas utilization field.

Summary

The instruments described herein have proved to be very useful in work in the utilization field. They are but a few of the instruments available for the analysis of gases. They are of great help in evaluating important aspects of appliance operation such as combustion efficiency and range of flame stability. In each case, the goal of instrumentation is achieved. That is, they permit measurements that were previously impractical or they release manpower for more rewarding application.

* * *

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Prepared by Leo T. Parker, attorney at law and contributing editor

What Is 'Contributory Negligence'?

Considerable discussion has arisen from time to time over the legal question: *When is a proprietor guilty of contributory negligence in causing a gas explosion which relieves the gas company from liability for the explosion?*

A higher court has recently rendered an important decision that clearly answers this important legal question. **This court held that the fact that a gas consumer exposes himself to a known danger and injury results does not always deny him a legal right to recover, but only in that class of cases where the danger is so obvious and imminent that a person of ordinary prudence, under like circumstances would not subject himself to it is the gas consumer negligent.**

Danger may lurk within every defective condition, and yet may not be of such character that men of ordinary prudence woud hesitate to expose themselves thereto.

The defect and danger, therefore, must be such that knowledge, or imputed knowledge thereof, would cause an ordinarily prudent person to appreciate the risk. In other words, mere knowledge of the danger of doing a certain act without a full appreciation of the risk involved is not sufficient to preclude a gas consumer from recovery of damages even though there may be added to the knowledge of danger a comprehension of some risk.

For illustration, in *Wainscott v. Carlson, 295 Pac. (2d) 649*, the testimony showed the facts, as follows: At approximately 1:15 p.m., a contractor was operating a tractor-grader in grading, leveling, and removing part of the topsoil immediately to the rear of the residence of one Wainscott. The contractor negligently ran against a gas line that ran from the gas main to Wainscott's house. The force of the blow against the gas line caused it to separate just adjacent to the foundation of Wainscott's house.

The Gas Company was informed by telephone of the broken line and escaping gas, but it did not act immediately on the advice and did not arrive at the home until after an explosion occurred. Further testimony showed that Wainscott's being apprehensive of the safety of his home and observing that no repairs had been made, went into the basement and proceeded to open windows in order to allow the accumulation of gas to escape. Then the gas exploded in a severe and violent manner and threw Wainscott with great force a distance of 12 to 15 feet onto the furnace in the basement, thus severely injuring him.

Wainscott sued the contractor and the gas corporation for heavy damages. He alleged that the contractor was liable and negligent for these reasons:

(1) In failing to establish the location of the gas line prior to excavating and grading the ground to the rear of Wainscott's home;

(2) In operating the grading equipment in such a manner as to cause it to run into and damage the gas line;

(3) In failing to establish the location of the broken line or gas leak and to take the necessary steps to cause the gas to escape in a manner so as not to endanger Wainscott and his property;

(4) In failing to recognize the dangerous situation and to take other reasonable precautions, and

(5) In failing to timely notify the Gas Company of the damage to the gas line.

The defendants alleged that Wainscott could recover no damages because his own negligence caused the explosion, and on the well established rule of law that one who voluntarily submits himself to a known hazard cannot recover for injury arising out of the assumed risk. The testimony showed that nearly two hours after Wainscott knew that the gas was escaping, he voluntarily went into the basement to open the windows, and the explosion occurred. He was, therefore, guilty of contributory negligence barring his recovery.

Although the lower court refused to award Wainscott any damages, the higher court reversed the verdict and said:

"It is not contributory negligence, as a matter of law, to enter the basement of a home where gas is perceptibly escaping, or to search for the location of the leak with a light. To do so may not be dangerous."

For comparison, see *Newland v. City of Winfield, 289 P. 402*. Here, a property owner used a lighted match to search for a gas leak and an explosion followed. In subsequent litigation, the court held that where one used an open light, such as a lighted match, to enter a cellar or a closed place into which gas was escaping, the question of his contributory negligence must be determined by a consideration of all the circumstances, such as the extent of the leak, the size of the enclosure where located and the length of time the leak had existed. **This court held that a jury must consider all testimony and render its judgment accordingly.**

For further comparison, see *Jelf v. Cottonwood Falls Gas Company, 160 Kan. 112*. In this case, the testimony showed that a property owner had noticed gas fumes in his house the evening before the explosion. It was contended that, for the property owner to remain in the house after the discovery of gas, and leave the pilot light on the hot water tank burning, constituted contributory negligence. **The higher court rejected that contention and held the question of contributory negligence was a matter to be submitted to a jury under all the surrounding facts and circumstances.**

For other higher court cases, see *26 A. L. R. (2d) 136, 183; Soulier v. Fall River Gas Works Co. 224 Mass. 53; Gillespie v. Monarch Carbon Co. 98 W. Va. 481; and Leavenworth Co. v. Ratchford, 5 Kan. App 150.* ★ ★ ★

Have you a legal question? Write us about it, and we will try to get an answer for you. Send your questions to Editor, American Gas Journal, P. O. Box 1589, Dallas 21, Texas.

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to capture your share of the vast new home and home modernizing market by offering your customers a MAYFAIR Matchless GAS Kitchen and Laundry complete package featuring fully Automatic Matchless GAS Appliances

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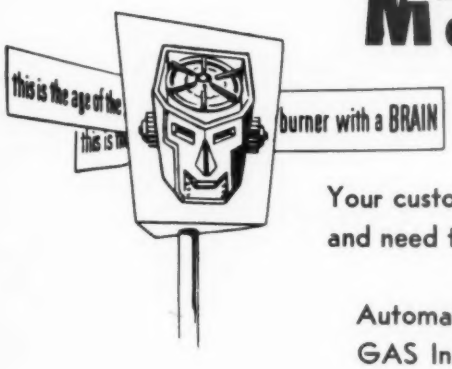

Your customers can select the appliances and cabinets they want and need to make their kitchen and laundry as modern as tomorrow . . .

Automatic GAS Ranges and Ovens . . . GAS refrigeration . . .
GAS Incinerators . . . Food Waste Disposers . . .
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Mayfair leads the way . . .
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MAYFAIR GAS KITCHENS, 2901 Stanley, Fort Worth, Texas, WAlnut 3-1301

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Queen of the Western Ranges

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built-in beauty
to last
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THESE FEATURES . . .

- *comfort level oven and king size broiler*
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WESTERN-HOLLY APPLIANCE COMPANY • CULVER CITY, CALIFORNIA • McGREGOR, TEXAS

Now you can do something about capturing the big potential year-around load of the new-home and modernized kitchen market...

All-Gas Kitchen Program On The Move!

Dean Hale, *Editor*

An official "world's premiere" awaits the more than 2,000,000 persons who'll visit the 1957 State Fair in Texas — the first public viewing of the gas industry's newest, fanciest, and long-awaited "Mayfair Matchless All-Gas Kitchens."

Stepping briskly to the fore in this unique new merchandising and load building venture is Lone Star Gas Company, which will put the All-Gas Kitchen in the public eye for the first time with a fabulous display in its Gas Building on the state fairgrounds in Dallas.

The event marks the entry of Lone Star as the first gas utility to actively undertake aggressive sales and promotion of the packaged kitchen units that will feature exclusively all-gas equipment for modern homemaking.

For the gas industry, the showing will be the opening wedge in a long-planned program to capture its share of the tremendous remodeling and packaged new kitchen market, estimated as the biggest potential load within reach of the gas utilities.

As Lone Star officials point out, the new Mayfair Matchless All-Gas kitchens will be competitive in every phase with the familiar packaged units offered by the large electrical manufacturing firms — even more so considering that a complete all-gas kitchen will be available in a lower price range, thus extending the market potential to include many families who have considered such "packages" too costly.

Lone Star's pioneering entry in the field will be followed by Ohio Fuel Gas Company, which will introduce the Mayfair Kitchens at the Ohio Home Builders' convention in November.

Participation in the "kick-off" phase of the program will also be undertaken by other utilities around the nation in subsequent months, including Empire Southern Gas Company, Brazos River Gas Company, and several large midwestern utilities that have not announced final plans.

From Dream to Reality

Development of the Mayfair Matchless All-Gas Kitchens as packaged units didn't come overnight. As must every idea of this type progress, from inception through research to market study to actuality, the process of getting the all-gas kitchen package from the notebook to the gas utility and thence into the consumer's home has been a slow one.

Two basic elements contributed to the birth of the all-gas kitchen package: A manufacturer with adequate production facilities looking for a new market, and an industry urgently in need of product that such a manufacturer could produce. Thus the stage was set.

In the role of the manufacturer is Mayfair, with plants in Forth Worth and Mineral Wells, Texas, producing top quality modular wooden kitchen cabinet units. Initially, the Mayfair organization specialized in custom-type units for builders and contractors only. As its facilities and experience increased, it sought greater markets for its products.

Sharing the scene is the gas industry — which has long needed an exclusively all-gas kitchen package to meet the growing competition from the electric industry, an active and aggressive competitor for the vast new-kitchen and remodeling market. It wanted exclusively all-gas kitchens of a type that would accommodate a variety of gas appliances — one that would be available in modular units that could be fitted to any customer's needs and/or pocketbook.

Thus, came the union of forces resulting in the Mayfair Matchless All-Gas Kitchens.

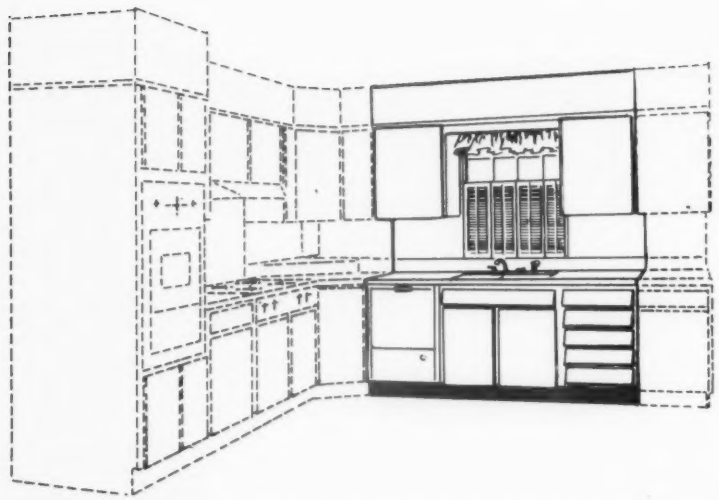
Climax of the long-term developmental program came in September when gas utility industry leaders met with Mayfair officials at Mineral Wells for a two-day session on getting the kitchen package program underway.

What the farsighted leaders in the gas utility industry think of this program was well summed-up by Charles Barndt, Director of Sales and Promotion for Lone Star Gas Company, in an address at the meeting:

"... Although the Gas Industry, through its New Freedom Gas Kitchen and Laundry Bureau, has made a valuable contribution to our efforts to influence the market nationally—and although gas companies have made substantial investments in kitchen displays at Fairs, Home Shows, and other public exhibits — most of the kitchen cabinet dealers remain pro-electric in their promotions.

We have attempted to develop a cooperative program with other cabinet manufacturers and although these manufacturers have always indicated an interest in working with AGA and our company, they market their products through independent distributors and dealers who appear to have given in to the overwhelming weight of "Live Better Electrically" promotions. Our relations with these dealers and distributors are good, and we believe they sincerely appreciate our exhibits at the State Fair and Home Shows but

In this issue, American Gas Journal is pleased to bring you this special 7-page feature (pages 39-45) highlighting the "kick-off" of the Mayfair Matchless All-Gas Kitchen package program. If you are interested in receiving more information on the program or appliances used in the program write us direct or use the handy Ready-Reply Card in this issue.



Modular units are featured in the kitchen package. Customized Mayfair cabinets come ready to slip in place, are available with all types of appliances and accessories to fit the requirements in size and cost for any customer. Using modular units, customer can expand kitchen at any time and be insured that all added units will perfectly match previously installed units.

when a customer indicates an interest in electric equipment, they will make no effort to sell the superior features of gas. Of course, there are exceptions to the general condition but the vast majority of dealers and distributors follow the electric pattern.

"It has been apparent for some time that the gas industry vitally needs a complete package kitchen consisting of cabinets and the basic appliances. The package kitchen is destined to play an even more important role in the tremendous remodeling market of tomorrow than it has in the new construction field. No one manufacturer produces all of these components so it was evident that we would have to find a firm who would assemble and promote such a complete package. Our hat is off to the Mayfair Cabinet Corporation — for they have developed such a complete package and propose to sell it with the most aggressive gas promotion our industry has ever seen. They will be able to do this, because Mayfair is a company rich in resources and manufacturing "know-how" — with their affiliated companies they are now the country's largest producer of wood cabinets.

"Moreover, they believe in the gas industry and have already invested many thousands of dollars in their gas kitchen program without asking the gas utilities to contribute a single penny to the venture. Furthermore, everything that they have told us they were going to do, they have done in even a bigger way. Mayfair is indeed composed of men of vision and action.

"Our company believes in Mayfair and the contribution it can make to the gas industry. It is true that Mayfair is a new name in the kitchen field, but I can assure you it will soon be a well-known and respected name in the area served by Lone Star Gas Company."

Lone Star Leads the Way

At the Mineral Wells meeting, Lone Star Gas Company announced its plans to begin immediately an aggressive selling program, paving the way for other utilities to "get on the bandwagon." Lone Star, serving 455 communities in Texas and Oklahoma and 700,000 domestic customers, sees a big future for the all-gas kitchen package. It had over 100 of its key personnel in attendance at Mineral Wells to get all the facts on the kitchens from Mayfair, the participating appliance manufacturers, and from other top gas utility leaders attending the meeting.

One of the nation's leading utility companies and certainly one of the most aggressive, Lone Star realizes that its experiences in merchandising the all-gas kitchen package will help other utilities as they enter the program.

Basically, Lone Star's program for merchandising the all-gas kitchens revolves around these major points:

- In its area, Lone Star will administer a cooperative program of advertising and promotion in which the utility, Mayfair, and various appliance manufacturers will participate.
- Lone Star will place kitchen displays on all of its display floors, showing complete kitchens in all of its larger offices; in its smaller offices it will display the major kitchen components, such as oven cabinets, burner cabinets, etc.
- The Mayfair kitchens will be used in all of Lone Star's auditoriums (for home service and other demonstrations) wherever practicable. The company has in use or in planning stages about 30 auditoriums.
- Each company sales floor (101 of these) will have complete promotional material on hand, showing the prospective customer how the kitchens can be purchased and telling them what the approximate cost would be.
- Mayfair Kitchens will be featured in public exhibits throughout its service area — such as the State Fair of Texas, Home Builders Shows, local fairs, etc.
- Lone Star's Architects' and Builders' assistance representatives will aggressively promote their contacts and keep them informed of all new developments in the kitchen equipment.
- Lone Star will familiarize all of its 6000 employees with the kitchens, how they can be purchased on convenient terms (especially for remodeling), and other necessary information.
- Lone Star plans to provide financing assistance for dealers and purchasers where necessary through banks, FHA Title I loans, or conduct its own plan, if necessary.
- Kitchen design service will be offered.
- Lone Star plans to tie-in the kitchen promotions with all other promotions, using all types of media – newspaper, TV, radio, direct mail, personal contacts, home builders shows, public exhibits, etc.
- Lone Star will begin the program by setting up dealers to handle the kitchens. The company's principal task will be promotion of the kitchen sales.

Lone Star feels that it has a big overall job to do and wants to do it in the most effective way.

A seven point "Profit Plan" is expected to assist greatly in acquiring dealers with good background in promoting and selling the kitchens. It includes:

a. The State Fair of Texas display, designed to invite inquiries.
b. TV advertising . . . if prospective customers see it, they'll want it.
c. Special Mailings to architects and builders . . . to create demand with people who plan new homes.
d. Local builders' magazines will be utilized, with ads describing the package kitchen, show features, etc., creating a demand with the builders as a source of volume business.
e. Exhibit homes . . . in conjunction with a special Lone Star sponsored TV show, "Showplace of Homes."

ABC

Laundry Equipment

Chosen exclusively for the

Mayfair.

matchless gas kitchens and laundries . . .

Wrinkle Free Tumble-Aire Drying . . .
A pre-setting that continues to tumble clothes in clean, cool, billowy air indefinitely after the heat shuts off. Clothes remain soft, fluffy, wrinkle free, even though not removed until hours later.

Three Separate Settings . . .
The ABC gas dryer is completely flexible in heat selection . . . drying any fabric safely, beautifully.

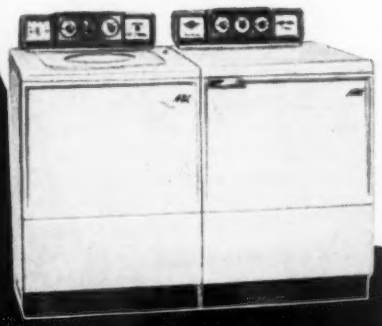
Large Satin Smooth Drying Drum . . .
New, non-perforated, extra large drum with 3 triangular baffles. Smooth porcelain enamel, inside and out.

New Slide Out Burner System . . .
permits quick, easy removal of the entire burner system, from the front, for cleaning and adjustment.

Large, Easily Accessible Lint Trap . . .
Located just inside door for convenient removal and cleaning.

All Porcelain . . .
Here's lifetime protection! Alkali resistant porcelain inside and out for beauty and durability.

NEW FEATURES

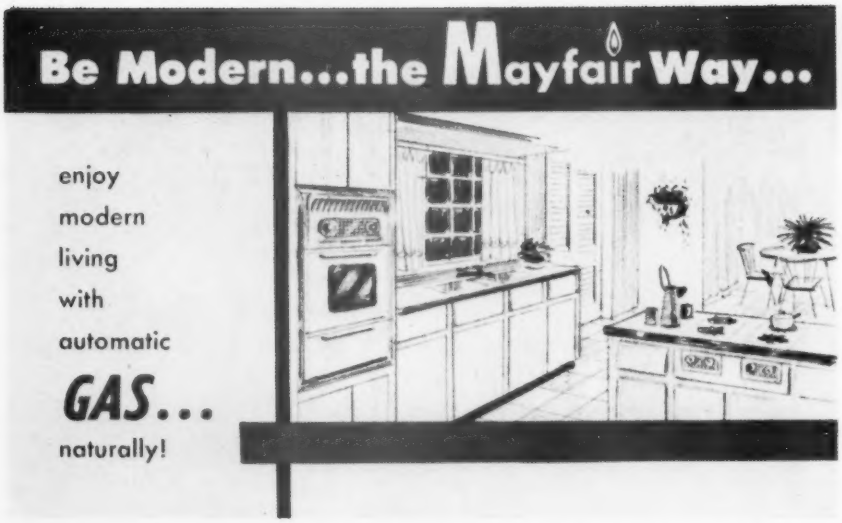


For 1958, ABC presents a full line of matched automatic washers and gas dryers. Dramatically NEW . . . with MORE automatic features than ever before. These brilliant new ABC washers and dryers are the finest ever built by ABC . . . the pioneers of home laundry appliances.

They are available in sparkling decorator colors, as well as classic white porcelain, to compliment and complete the modern Mayfair matchless gas kitchens and laundries.

MAKE A DATE
TO SEE THE '58
ABC
WASHERS & DRYERS

ALTORFER BROS. COMPANY
PEORIA, ILLINOIS



Cover of attractive 3½ by 5½-in. "handout" piece that can be utilized by meter readers, servicemen, and other gas utility employees in bringing attention of customer to fact that ALL-GAS Kitchens are now available.

f. Increased newspaper advertising on build-ins, promoting kitchens.
g. Special advertisements to tie-in the Mayfair Matchless Gas Kitchen dealer.

All in all, the Lone Star program covers the waterfront and will provide as complete a merchandising program as the gas industry has seen.

What Goes into Mayfair's Kitchens?

Cabinets. Mayfair Cabinets are constructed of the finest quality hardwood. They are modern in design, yet have a distinct custom appearance. Drawer fronts are of modern "tear drop" design and all drawer pulls are of the recessed type. The cabinet doors feature underside recessed pulls and concealed hinges. No hardware is visible. Cabinet drawers use furniture type hardwood guides. Drawer bases and cabinets have standard recessed bottoms for ample toe space. All cabinet doors are of the hollow core type. Mayfair cabinets are on a par, "quality-wise" with the finest wood cabinets manufactured. Cabinets are medium priced.

Appliances to be offered to make package kitchens. Appliances used in Mayfair All-Gas Kitchens have been chosen on the basis of quality and national acceptance. These appliances consist of the following lines of nationally advertised appliances — free standing and built-in ovens and ranges; disposer units; dishwashers; automatic washers and gas dryers; intercom systems with master kitchen units; and gas incinerators. Only those appliances whose manufacturers agree to jointly promote these All-Gas Kitchens and Laundries have been chosen as standard equipment — thus giving a combined industry-wide promotion program for consumer advertising and promotion. None of the above equipment need be stocked by any gas utility company or their authorized distributor/dealers. Appliances may be purchased direct from appliance manufacturers or distributors if desired. All appliance prices quoted by Mayfair include a markup for handling. Lower prices, in most cases, can be obtained by contacting appliance firms direct rather than purchasing through Mayfair.

Other Services Offered

Training gas utility personnel. No special training is required of gas utility personnel other than the understanding of the literature and the important features of the Mayfair All-Gas Kitchens. However, if desired, Mayfair will arrange to conduct training meetings of gas utility personnel.

Financing. Mayfair All-Gas Kitchens and Laundries and appliances can be financed by the franchised gas utility; by FHA Title I loans and conventional bank loans; or by other financing organizations. Financing of the kitchens and appliances on meter bills is a desirable sales feature in promoting gas kitchens.

Advertising and Promotion. A cooperative advertising allowance of 3 percent is given by Mayfair on all annual purchases of cabinets and appliances invoiced through Mayfair to individual franchised gas utilities, their distributors and dealers. For local advertising, mats, radio transcriptions, TV films, and literature will be supplied without cost or in cases of special material or special quantities, at actual cost. Mayfair is maintaining a full time promotion and publicity staff to assist local gas utilities in promoting Mayfair All-Gas package kitchens. Promotions are based on such themes as "Naturals — Natural Wood and Natural Gas"; "Flame Fast Gas Kitchens," etc. The advertising allowance is made only to franchise utilities and not to distributors and dealers.

Parade of Homes Participation — Special prices on "Complete Gas Package Kitchens and Laundries" will be available to franchise utilities. This price is based on a package — with appliances specified by the utility. To protect the interest of gas utilities, the special Parade of Homes prices will be offered only on "Complete Gas Packages."

Dealer Signs — Illuminated dealer signs, etc., are available to authorized Mayfair dealers. Signs may be paid for from the advertising allowance.

Literature — On Mayfair Matchless Gas Kitchens and Laundries is distributed free of charge in limited quantities. Literature in quantities for special promotion is available at cost — both in black and white and in color. Cost of this literature may be paid for from the utility advertising allowance.

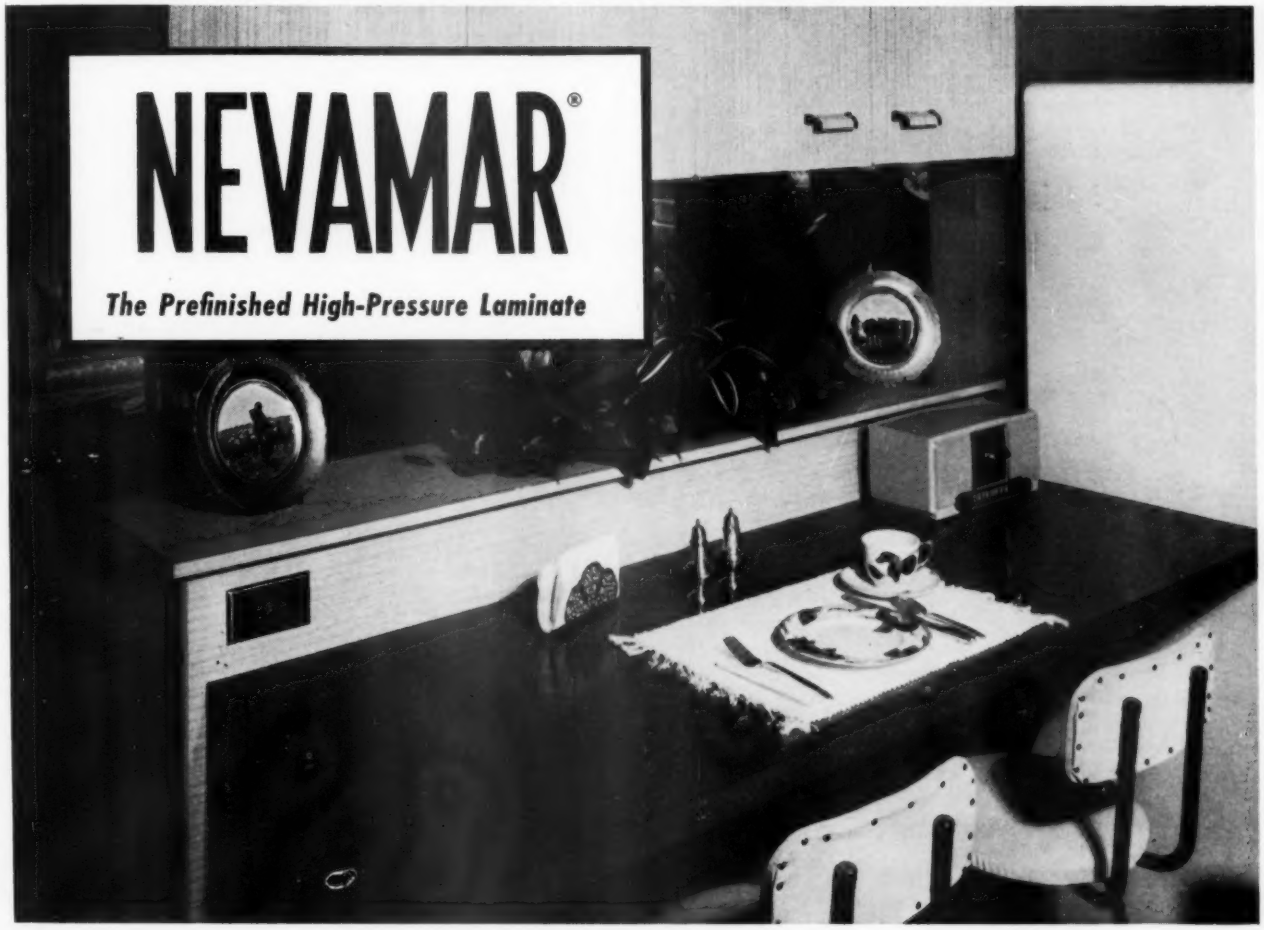
Appliances and Appliance Tie-In Advertising. Coordinated national advertising and promotion on Mayfair All-Gas Kitchens and Laundries will be conducted jointly between Mayfair and all of the appliance manufacturers whose products are standard items. This, in effect, will give these gas kitchens an advertising program aimed at selling more ALL-Gas Kitchens and Laundries and gas appliances at the local retail level. Franchised gas utilities and their dealers may purchase these kitchen appliances either from Mayfair or direct from appliance manufacturers.

Companies affiliated with Mayfair (the world's largest manufacturers of factory finished wood kitchens) producing these kitchens are offering special sales incentive plans to their own direct factory salesmen to sell gas appliances in large builder and project kitchens in Mayfair franchised distributor territories. These sales personnel will work in close cooperation with each local gas utility company handling the Mayfair Kitchens and Laundries, giving them a direct tie-in at the larger builder level and project level in order to sell more gas kitchens, thus presenting a double edge sales weapon for gas.

Contracts. Exclusive Franchise Distributor Contracts will be entered into for a period of three years.

Utility Participation. Unless the utility participates in the program either as an active distributor or franchise holder, Mayfair All-Gas Kitchens and Laundries will not be sold in that area, regardless of interest on the part of the public, contractors, or distributors. ★

In Mayfair Matchless Gas Kitchens it's the surface that makes the sale



Let a customer feast her eyes on the heavenly NEVAMAR surfaces in a Mayfair Kitchen and your sale is practically made. This satin-smooth high-pressure laminate was first choice when Mayfair designers sought the ultimate in surfacing materials. It is the big plus value that is built into every Mayfair Kitchen. It represents a happy blending of eye-delighting beauty and carefree duty . . . a surface that shrugs off stains, scars, scratches and burns . . . keeps its unmarred loveliness through years of faithful service and never needs refinishing. Point to the NEVAMAR surfaces and you'll sell Mayfair Kitchens with ease.

This is **NEVAMAR**®

- a high-pressure laminate surface
- designed for long life and lasting beauty
- resistant to cigarette burns
- withstands boiling water
- won't craze, crack or peel in normal use
- not affected by alcohol, fruit acids, ammonia, ordinary ink . . . or time
- easy to clean
- never needs painting

Guaranteed by Good Housekeeping

NEVAMAR conforms to NEMA Specifications

NEMA

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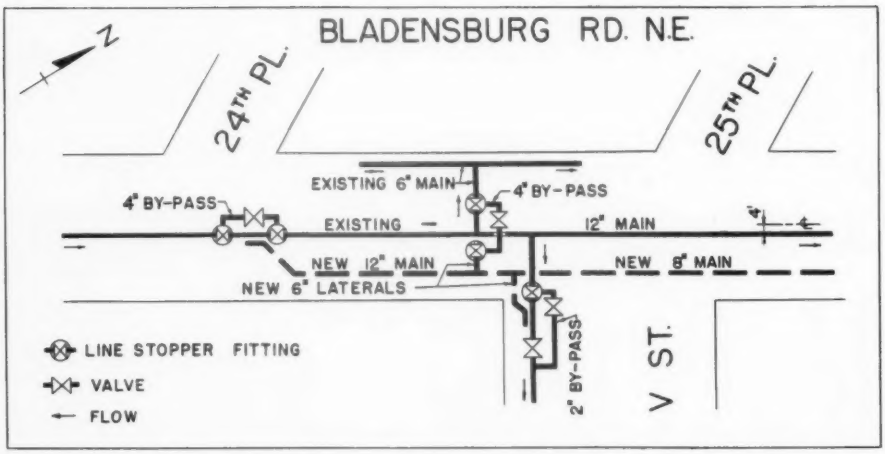
Chicago, Ill.: 4900 W. Madison St.



Map shows locations of the five tie-ins.

AS WITH most gas utility companies over the country, Washington Gas Light Company, Washington, D. C., has been confronted with the task of making changes in its distribution system because of street and highway widening and repaving work in the federal highway improvement program. Here's how one such problem was solved quickly and efficiently.

Because of planned highway work on a section of U. S. Route No. 1, a principal truck route along the Atlantic Seaboard, through its area, the company contracted to have new 12 and 8-in. steel mains installed along Bladensburg Road from 24th Place NE to Eastern Avenue, at the D. C. Maryland line, to serve as replacement for an existing 12-in. cast iron main. These new mains will eliminate maintenance for the company after the highway improvements are carried out.

An existing 12-in. cast iron main served all customers in the Langdon area of Washington and these included many industrial users. The requirement of one industrial customer in the area is 9700 cu ft of gas per hour. The company's street department wanted to serve all customers in the Langdon area without interruption of service to them while tie-ins of the new 8 and 12-in. mains were made to the existing 12-in. main and the 6-in. lateral mains along a 200-ft section of Bladensburg Road NE.

How to accomplish this became another job for the street department's planning section. There the "Advance of Paving" job was pre-planned by planning engineer Keith Fellows and then supervised in the field during installation by assistant general foreman Charles Barbour. To help them see the job through to completion as planned, and on time, whole-hearted cooperation was given by various sections within the street department, as well as other departments within the company.

Five Tie-ins In One Day

Major requirement of the job-plan as worked out was that all five of the tie-ins, required to replace the existing line with new line, had to be made in a single day.

This called for using the company's 12-in. line stopping equipment. Success of the job-plan required doing as much preliminary work as possible before making the actual tie-ins.

Two days prior to the tie-ins, street department personnel completed all necessary excavation and preparatory work before the actual tie-ins of the new mains could be started. This included installing the line stopper fittings on the existing mains.

One day prior to tie-ins, the new 8 and 12-in. steel mains were purged with carbon dioxide under the supervision of safety engineer Donald Ryan. The same day, the existing cast iron 12-in. main was drilled through at two points where the 12-in. line stopper fittings were placed. Three lateral lines, all 6-in. steel mains, were also drilled through 6-in. line stopper fittings.

With all possible preliminary steps completed, work was started at 7:30 a. m. on "Tie-in Day" to make the five tie-ins necessary to replace the existing 12-in. main that supplied the Langdon area. By 4:30 p. m. the same day, all connections were completed without interrupting service to any customer.

How Did They Do It?

How was such a feat accomplished? First of all, the existing 12-in. main was stopped off at the two points drilled the previous day. As these stoppers were inserted, a 4-in. by-pass line connecting the two stopping machines was put into operation. This carried the gas around the section of main which was to be cut out and removed. After completing this operation, a 45-deg welding ell was installed to connect one end of the existing 12-in. main to the new main. Next, the new 12-in. main, filled with carbon dioxide, was gassed by means of a take-off line from the 4-in by-pass.

This same operation was repeated at similar tie-in points three more times during the day. These involved the use of 6-in. stopper equipment to connect the existing lateral 6-in. mains to the newly gassed 12-in. main.

Throughout the day, these 6-in. lateral lines served the area's customers continuously. Their supply came from the existing line until the instant a valve switched this supply to the new 12-in. main, as each of the remaining three tie-ins was completed.

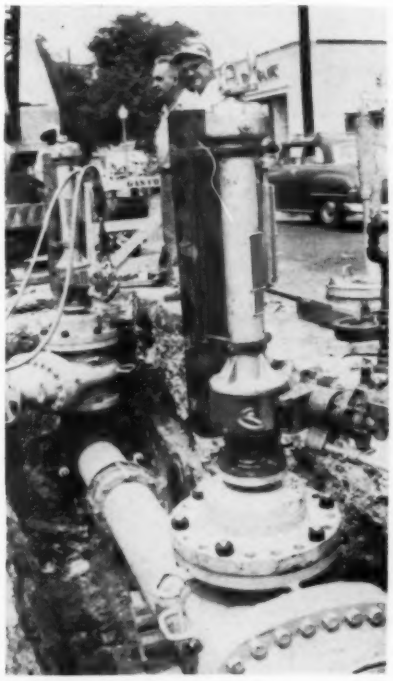
Once all lateral lines were fed by the new 12-in. main, the 4-in. by-pass line was valved off to stop the flow of gas into the section of cast iron main to be abandoned. The old 12-in. line was then purged with carbon dioxide, blown clear with compressed air, and sealed at both ends.

Acknowledgment

Photographs and material for this article were made available through the courtesy of David Rains, Editor of *Wonder Flame*, company magazine of Washington Gas Light Company.* *

Pre-Planning Pays Off On Main Replacement Job

Air-driven tapping machine with shell cutter is attached to special gate valve, which is secured to 12-in. line stopper fitting on existing cast iron 12-in. main. At lower right is new 12-in. main, which is to be "tied-in" to the existing main.



Both air-driven tapping machines drill holes through cast iron pipe simultaneously.

With both stopping machines in place, stoppers inserted in main and 4-in. by-pass line in operation, gas flows from reader's right to left. Beneath the by-pass line, a section of the old line has been cut out and the 45 deg welding ell is being installed to connect the new 12-in. main.

Crane lifts both line stopper machine and stopper from top of the gate valve.

Completion plug is screwed into place as crane lifts special gate valve from line. Next step will be to bolt completion cap over plug. Notice the completed 45-deg welding ell (lower left) which ties in existing 12-in. main with new 12-in. steel main.

Modern Methods of Service Request Dispatching

When requesting service from her gas company, a customer has confidence that the serviceman will provide her with courteous and efficient service. Her primary concern at the time of making a request for service is when will the serviceman be there. Whether her need for service is immediate or for some future date, the important thing is that she wants the service at a time that will fit her plans.

Living in a world where business competes to satisfy every whim of the customer, she is accustomed to the very best in goods and services. To insure this service to the customer while utilizing available manpower effectively and efficiently is a challenge to any dispatching organization. To meet effectively the challenge of better service and greater efficiency, the dispatching organization must find workable answers to questions such as these:

1. How can a fluctuating request load be met with a comparatively stable work force?
2. How can accurate values be applied to the various types of service requests that will reflect premise time, driving time, density of area, incomplete orders, etc., thus permitting the rapid conversion of the over-all request load to manhours required?
3. What is the best order execution schedule to insure maximum service to customers and still provide the flexibility needed to meet the variations in the request load?
4. What kind of over-all organization is needed to provide the necessary coordination of order receiving, order dispatching, and field service activities?
5. How can the request load be predicted in advance to insure the meeting of all committments?
6. What is the best type of communications equipment?

These are, of course, but a few of the many questions that must be answered. To maintain an effective over-all service policy, order receiving and dispatching techniques must keep pace with the advances being made in other fields of the utility business. Unfortunately, this has not been done in many cases. As recent as seven years ago, a survey of 16 companies revealed that only three had a policy of scheduling all customer requests on an organized basis. During recent years there has been an increasing interest in the dispatching problem, not only by people directly involved in the dispatching organizations but also by top management.

The purpose of this series, developed from presentations made at the annual AGA Distribution Conference in Houston, is to show that these problems can and are being solved by modern dispatching organizations. The following articles describe the dispatching operations of four companies. While each has its own individual problems and solutions, it is hoped that those having an interest in the dispatching problem will find the experience of these companies beneficial in the future development of their own programs.

How Baltimore Gas & Electric Company Does It:

Daniel L. Drake
Assistant Superintendent,
Gas and Steam Distribution
Baltimore Gas & Electric Company
Baltimore, Maryland

A customer calling to request service from the Baltimore Gas and Electric Company is connected with a central customer service board, whose personnel are trained to handle properly all types of inquiries pertaining to the company's business.

When such calls deal with gas, the call ticket, which is of "snap-out" carbon type in duplicate, is prepared and forwarded via pneumatic tube to the gas dispatch room. Upon arrival at the dispatch room, the original (workman's copy) is separated from the duplicate (office copy). At this point the original copy is forwarded either directly to the dispatcher if it is of a domestic nature and is scheduled for completion on the same day, or to the pending order file if it is scheduled for completion on a subsequent day.

If the call ticket pertains to a gas heating, refrigerator, or dryer installation, on which a complete service history is maintained, the order is given special handling to guard against repeat complaints.

The principal appliances on which complete service histories are maintained are the gas heating appliances, of which there are now approximately 125,000 active units. All such requests for service are worked against the record file before being assigned to a serviceman, at which time information pertaining to the types of appliance, whether or not it represents a "repeat complaint," and if so, how may prior calls have been worked, is indicated on the work ticket. In addition, if the call is a "repeat complaint" call, a brief card history of prior service is attached to the work ticket.

The work ticket then, with or without a prior history card, is forwarded via conveyor belt to the dispatcher — if it is scheduled to be worked on that same day — or to the pending file, if it is scheduled for completion on a subsequent day. The duplicate copy, in the meantime, is filed by address and posted according to the progress of the order to serve the double purpose of determining whether or not the call is a duplicate of an order received earlier and to indicate the location of the work copy so that, if at any time prior to the completion of the order, an inquiry is received for information pertaining to its status, the required information is available.

Scheduling Orders

The priority for working, which is assigned to the order, is determined from an "order of execution" scheduled by the person receiving the call from the customer. This schedule indicates the date on which the order is to be worked, and in addition, for those orders to be scheduled for completion on the same day, the maximum permissible time before the serviceman's arrival at the customer's premises.

There are four order execution schedules, namely:

Normal order execution schedule for days of normal work load,

Alternate order execution schedule for days with abnormal work loads,

Saturday order execution schedule, and

Sunday or holiday order execution schedule.

The use of the order execution schedules has made it possible to advise customers, at the time of their initial contact to request service, the date on which a serviceman will call. It has been found that this plan is quite satisfactory from an operating point of view and that it has been enthusiastically received by customers.

The serviceman on the street, in the meantime, has been working service requests that are scheduled for completion on the particular day concerned and which were assigned to him at the start of his work day. If, at any time during his work schedule, a serviceman determines that he will probably require overtime to complete his assigned work, he must so notify the dispatcher who will accept some of his work for reassignment to another serviceman. As a practical application, this report on the part of the serviceman usually occurs at the time of a scheduled call to the office, but in addition, if he becomes "stuck" on a particular job, the rule still applies.

Orders taken by servicemen for parts that they do not carry and requiring completion on either the same or the next day, are similarly phoned to a dispatch clerk who arranges for a proper order to be issued from which parts are obtained, and the order to be rescheduled for completion as required.

"Tote" Board

The basis for the work to be assigned to a man at the start of a day is determined from the horse race "tote" board which indicates at all times the man-hour commitments for the current, as well as for future days.*

Briefly, for the benefit of those not familiar with its operation, the "Totalisator" as the machine is called, has served as a backbone for work assignment planning in Baltimore since its installation in January, 1956. It consists of a handy key box containing keys similar to an adding machine, which are used to transmit data electrically to the calculator from which the number of calls in various categories and the total committeed manhours for designated days are tabulated.

From information developed by the use of this machine, curves have been established reflecting the influence of season, temperature variation, and work classification from which a prediction can be made of the man-hour requirements for future days. Since the machine maintains a running total of manhour commitments, the figures can be checked against the expected commitments at various times during the day in order to develop accurately whether or not additional manpower is required to curtail overtime.

Supervisor of dispatch room, seated at lower left, has on his desk a three-box telephone unit containing all the lines terminating on the dispatch board desks, and Executone unit that permits him to contact either the dispatcher or any of the telephone clerks. Others shown are clerks who receive tickets, tally, file, clear, post, etc. Customer's original call ticket is delivered from central customer's service board to dispatch room via the pneumatic Lampson tube system — the two vertical white pipes. At left of man seated in front of Lampson tubes is what appears to be a stepped arrangement. This is the group of dividers, indicating in which slot tickets are to be dropped for delivery to the house heating record files.

Square opening at the right of group shown is access opening to dispatch room. Tickets dropped into slots for posting are delivered to appropriate clerk at file cabinet, where history card for that particular house heating installation is maintained. Ticket is delivered via conveyor belt, which carries it along its individual track to desk concerned. After ticket has been posted with all necessary information, it is placed in single slot to the extreme right of the conveyor belt on which it was delivered. This small return conveyor belt then returns the ticket to the dispatch room, and to dispatcher if it is one requiring that it be dispatched on the day of receipt.

*The "tote" board was discussed in an article *"Tote Board Schedules Service Calls"* in the September, 1956, issue of AGA MONTHLY.

How The "Totalisator" Is Used

Thus, on a daily basis, from information developed by the "Totalisator," men can be diverted from maintenance work to service work or from service work to maintenance work in order to minimize overtime and to eliminate standby time. In addition, prior to the particular day involved, it serves in providing the necessary data to determine the number of full-day and partial-day runs that will give the best operating characteristics but still enable proper execution of all work expected in the next work day's receipts, which will be scheduled for completion on that day.

In its early application, it was found that a full-day run consisting entirely of work that was scheduled for completion on the same day resulted in unnecessary overtime. To minimize this problem, 75 percent of the work assigned as a full-day run is work that must be completed on that day. For the remaining 25 percent, fill-in work or work that does not require completion that day is assigned. Adoption of this practice resulted in giving the dispatcher the opportunity either to substitute same-day work at the time of a serviceman's single afternoon phone call or to complete the assigned work already in his possession.

Importance of Dispatching Tools

The ultimate problem in any dispatching arrangement resolves itself into the methods to be employed, or in other words, the tools with which a dispatcher is equipped to enable him to cope with his problem. With unlimited time, anyone can do a good and economical dispatching job, but under the press of urgency, a dispatcher must do a job of maximum efficiency in a minimum of time.

In order to accomplish this, the bulk of the area covered by our gas distribution system is gridded into rectangular grids and each service request is identified by its grid at the time of receipt. Dispatching is done by one man at his desk, which somewhat resembles an organ console and contains a compartment for each grid zone.

Within a compartment we use plasticized dividers of different colors from which we can determine the grid areas in which a serviceman is assigned, the operating station from which he works, whether he is working the regular 8:00 to 4:30 shift or is a so-called late shift man, and which jobs of those in a particular grid compartment are most urgent.

Thus, when a serviceman calls and gives his grid location, the dispatcher is required to look at a minimum of orders to select a proper assignment.

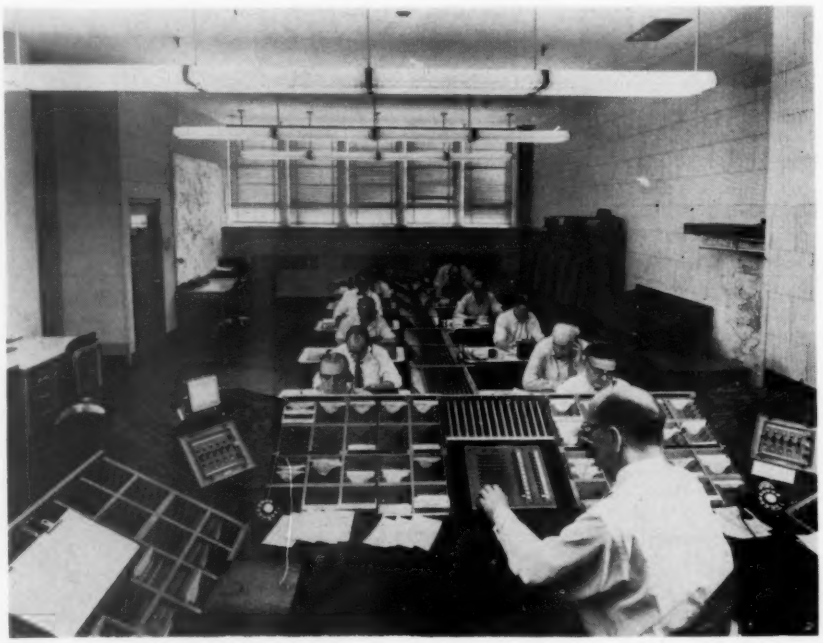
Supervisor's desk, lower center, shows telephone boxes and Executone on right side of desk. Supervisor stands next to the **Totalisator,** comparing work received that day with available manhours. Directly behind Totalisator is radio dispatcher, located at the left elbow of the dispatcher, who is shown at console-type desk at upper left. At the front of this is a sloping chute through which he drops tickets to be assigned to man on the streets.

The phone call itself is handled by a clerk who contacts the dispatcher or his supervisor by means of an interoffice communication system thus leaving the dispatcher free for his primary task of selecting the proper assignment for each serviceman.

Once the dispatcher has made his selection of an assignment, the order or orders are delivered to the proper clerk via conveyor belt and thence, after the order has been transmitted, to file via other conveyor belts.

The use of this conveyor belt system was designed and developed in Baltimore. It completely eliminates the need for messenger service or physical handling of tickets in their travels during the dispatching operation.

Part 2 of this four-part discussion will appear in the next issue of American Gas Journal. * * *



Serviceman calling from the street is answered by one of clerks shown. After receiving pertinent data from serviceman, telephone clerk signals dispatcher in same room by depressing one of the buttons on top of his speaker unit. Dispatcher recognizes this signal by depressing corresponding button on his master unit, which determines the information necessary for him to decide on the serviceman's next work assignment. If addition work is to be assigned, he selects work from the appropriate grid zone and drops it into the numbered slot above his Executone master unit, from which it is transported via conveyor belt and the appropriate track to clerk concerned. Clerk then transmits the work assignment to serviceman over telephone, after which he drops it upon a return conveyor belt directly under one on which the ticket was delivered to him. This belt returns ticket to file of dispatch work.

Meter Changing for Routine Test and Insulating Gas Services Combined into One Program

John Emery
Assistant General Superintendent
Rio Grande Valley Gas Company
Brownsville, Texas

ALTHOUGH general practice in the gas industry is to use insulating meter swivels in conjunction with routine meter changes for test, a very satisfactory variation of this plan is to do routine change of meters as a part of an overall meter insulation program.

In a typical insulated domestic meter setting, we have instituted a program of insulating domestic meter settings with nylon bushings in the risers on the company side of the loop above any regulators used. All new and replacement services are insulated. In order to increase coverage of cathodic protection on distribution systems in an orderly and on a scheduled basis, it is necessary to go into existing distribution systems and insulate all existing services as an integral part of a cathodic protection application.

In the past four years, Rio Grande Valley Gas Company has gone into a number of individual distribution systems and applied reasonably complete cathodic protection on all mains and services. This program is coordinated with a program of replacing all bare pipe in these systems so that practically all pipe to be protected is coated and wrapped steel pipe.

In the first systems so protected, no thought was given to changing meters for routine test, even though it was necessary to disconnect each meter in order to re-fit risers to accommodate the insulating bushings. We had been doing considerable maintenance work — such as painting meters and risers, repairing leaks, etc., in conjunction with this insulating.

In 1955 it was found that a distinct advantage might be obtained by coordinating routine meter changes with this program. In previous years each district was furnished a list of meters in its district due to be pulled and run through the meter shop for routine test.

Fig. 1 shows a load of meters after being pulled and Fig. 2 shows meters going through the meter shop. Normally, these meters are changed out by servicemen in each district as a part of their regular work load during the year.

Since 1955, service personnel, who accompany the insulation crews and turn the gas back on after each riser is insulated, carry with them lists of meters to be pulled for routine test during the year. A typical serviceman and truck engaged in such a job is shown in Fig. 3, checking numbers of meters in service and placing a new meter by each such meter to be removed.

When the insulating crews move in and find a new meter placed at a riser, they hang it, pull the old meter, and leave it there. The serviceman picks up the old meters and does the necessary paper work. Fig. 4 shows these men at work.

Instead of insulating meters as a part of the routine meter changes, meters are changed as a part of an insulation program. We have found that — since

FIG. 1. **Load of meters** pulled for routine test and ready to go through meter shop.

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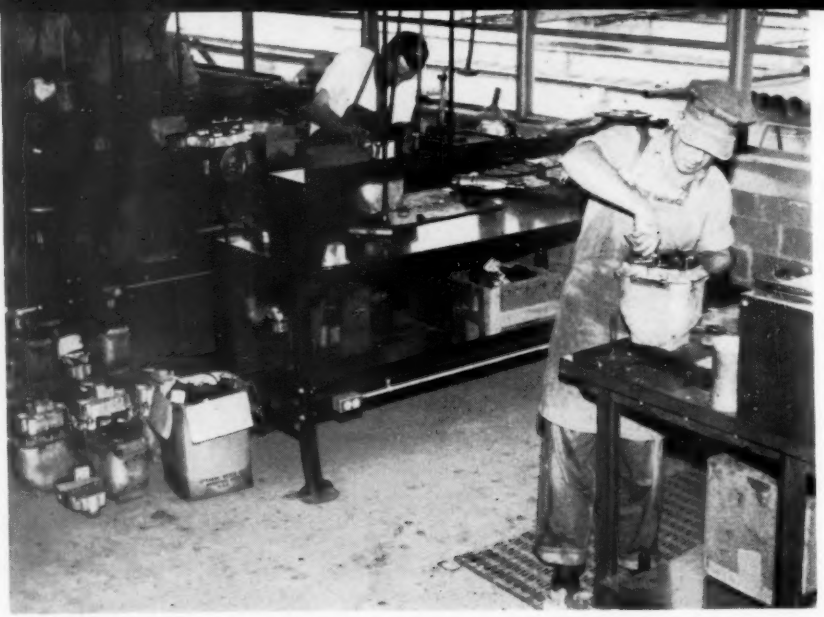


FIG. 2. **Routine test meters** going through Rio Grande Valley Gas Company's Weslaco shop.

FIG. 3. **Serviceman checks meter** numbers to find meters to be pulled.

each meter must be disconnected to be insulated — very little additional time or labor is involved in changing meters when and if necessary. In the district in which this program is now being used, just as many meters are changed out for routine test as a side issue of the main job of insulating as could be changed by the two servicemen alone working on meter changes. A 12-man crew is normally used including two servicemen for insulating. Changing routine meters does not slow the insulating job in the least.

We feel that any company that insulates as we do, and has a similar program for routine change-out of meters, should investigate the possibilities and advantages of combining the programs.

* * *

FIG. 4. **Insulating crews** doing typical work in distribution system.

Your Public Relations: HOW GOOD?

Here's a handy check list of 50 questions to ask yourself in evaluatng your PR efforts

Paul Lockwood

SOME BUSINESSMEN think of public relations in much the same way as they do of their fire station—to be called when there is an emergency. Public relations, good public relations, is preventative medicine—not the doctor or the undertaker.

What is public relations?

Even today public relations is a mystery to many gas company executives. Some, for instance, consider it a high science. Others think of public relations as printed publicity. Actually, public relations is just good common business sense in the way a gas company conducts its business with the public. The things that you and your employees do mold public opinion —good or bad—about your firm.

You cannot go out and buy a pound, gallon or cubic yard of public relations. It is not for sale. You and your organization must create it. You must plan it. And, you must work on it to make it a success.

Here is a check list of the elements that go into making a successful public relations program for a gas company. Check each of the points listed that you can honestly answer with an unqualified "yes." Then, add up your check marks, multiply by two, and you will have your score for your firm's present public relations. The unchecked questions will point the way to developing a more successful public relations program for your gas company.

Public Relations Check List

Civic Responsibility

——Do you belong to organizations in your community in each of these classifications—church, lodge, service club?
——Do you take an active part in at least one of these organizations of which you are a member?
——Are you a strong supporter of programs designed for the civic betterment of your community even though there is no personal gain involved?
——Do you participate in the recognized worthy charity drives in your community?
——Do you contribute your business know-how, facilities, and time to make every civic enterprise a success?

Personnel Relations

——Does your salary and employee benefit program compare favorably with other employer's plans in your community?
——Do you take a genuine and sincere interest in your employees and in their problems?
——When it is necessary to discharge or layoff an employee, do you explain the situation completely to the worker?
——Do most of your advancements to better positions in your gas company come from within the organization?
——Do you keep all of your employees informed about the goals, problems and position of your company all the time?

Business Correspondence

——Do you answer all letters you receive promptly as possible?
——Do your business letters have a pleasant, friendly tone that gives a true impression of your gas company?
——Do you personalize your letters so that the person receiving the letter does not feel "you say that to everyone?"
——Is there anything in your letters that might have a different meaning than the one you intended?
——Does the physical appearance of your letters create the kind of impression you want people to have of your firm?

Telephone Technique

——When answering the telephone, do you have a "smile" in your voice?
——Do you introduce yourself and give your company indentification when answering the telephone?
——Do you make it a point to get your caller's name when you start talking on the telephone?
——Do you personalize your telephone conversation by using the caller's name while talking?
——Do you always answer your telephone calls as promptly as possible?

Advertising Attitude

——Do all of your advertisements fit into the character you want to create for your gas company?
——Are your advertisements prepared in good taste to give people a feeling of confidence in your firm?
——Do you avoid the tendency to knock your competition in your advertising?
——Do all of your advertisements have some means of identification for your gas company?
——Do you avoid any misleading or semi-true advertising that will be a business boomerang?

Printed Publicity

——Do you know the publisher or editor of your local newspaper personally?
——Do you keep your newspaper informed of any personal or business activity that is newsworthy?

Need this article for your files? Tear it out and tuck it away!

——Do you avoid the tendency to be a "publicity grabber" for any little thing that happens?
——Do you refrain from complaining about the amount of publicity you receive in comparison with other businessmen?
——Do you give the common place publicity about your gas company a different twist to make it more interesting?

Handling Complaints

——Do you make every effort to handle all complaints and adjustments promptly?
——Are you fair in all settlements offered to your customers about their complaints?
——When you are at fault, do you quickly shoulder the blame instead of grudgingly making an adjustment for the customer?
——Do you live up to the spirit as well as the letter of all agreements you make with your customers?
——When dealing with a "chronic complainer" are you fair, but firm?

School Relations

——Do you have special arrangements made with local school officials to handle speaking assignments on the gas industry?
——Have you considered a special scholarship for outstanding students to give your gas company better recognition with parents and the students?
——Have plans been made for handling tours of your plant for school groups?
——Do you know and inform local school people about films on the gas industry that are available?
——Do you encourage your employees to take advantage of the special evening instruction offered by local schools?

Creditor Relations

——Do you pay all invoices as promptly as possible within the dating allowed?
——Are you fair in seeking credits and adjustments from the vendors involved?
——Do you recheck carefully on any errors that seem to indicate a difference between the invoice amount and the amount received?
——When it is necessary to delay payment of an invoice for some reason, do you inform the vendor of the situation?
——Do you consider salesmen calling on you business friends rather than as business enemies?

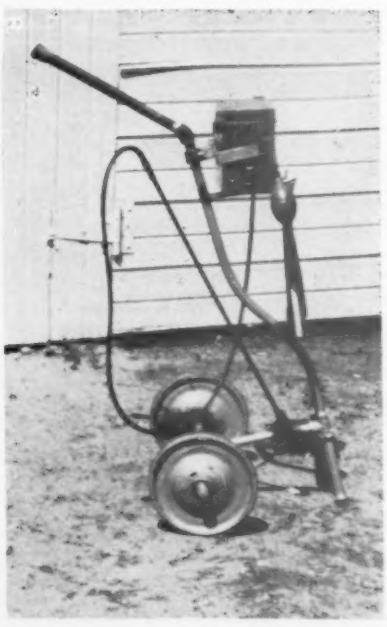
Credit Accounts

——Do you carefully explain all rules and regulations about your billing procedure when service is started?
——When following-up over-due accounts, do you have a system that still holds the good will of these slow paying customers?
——Do you have a convenient system for people to pay their gas bills?
——Do you make it easy for people to pay either by mail or at some convenient location?
——Do you give people every opportunity to make some plan of settlement before taking drastic action on your over-due bills?

These 50 questions will give you a cross-section of your public relations program. All are important to the future success of your business. All have a bearing on the opinion the public will have of your gas company. By applying good common sense to any areas that show a weakness, you can improve your public relations in your community. * * *

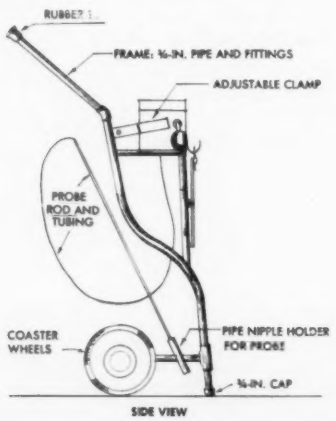
Ideas At Work

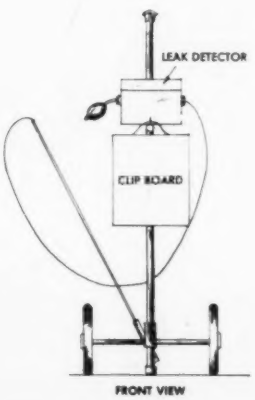
Caddy Cart for Leak Detector



In Waverly, Iowa, John Sullivan and Rich Arends, gas servicemen for Iowa Public Service Company, have turned perspiration into inspiration and come up with a mechanized leak detector that should catch the fancy of survey men.

The caddy-cart is made up of a few pieces of old ¾-in. pipe; some fittings requisitioned from a convenient bin, a set of wheels from Junior's forgotten coaster wagon, and the tip from Grandma's cane. Total cost: About 94 cents.





American Gas Fundamentals

A Continuing Educational and Refresher Course in Gas Technology, Management, Equipment, Operations, and Utilization

Natural Gas Production and Field Processing

PART 2

Increased production of natural gas has been accompanied by technological advances, the most notable of which are based on the discovery of characteristics of the gas hydrate. Development in equipment design followed, making it possible to control the use of this knowledge.

For many years the transportation of natural gas was plagued with failures in transmission lines during the winter months, just when fuel was most urgently needed. This was sometimes the result of equipment failures, but more frequently it was caused by a blocking of lines with what was then thought to be ice. The transmission men called this blockage "freezing up," and they anticipated this troublesome phenomenon each winter. It was a phenomenon because the gas lines often became blocked at temperatures well above the freezing point of water.

In 1934, a paper by E. C. Hammerschmidt cited investigations that led him to conclude that the "freezes" in gas transmission lines were the result of *gas hydrates* and not water ice. This led to experiments by the Bureau of Mines[4] in the course of which hydrates were manufactured experimentally in the laboratory and temperature of hydrate formation was charted for several types of pure gases. Experiments showed that water was only a small part of the hydrate molecule, accounting for about one-sixth of the molecular weight, the remaining five parts being hydrocarbons from the gas itself.

Some experts, concerned with the transmission of gas, reasoned that no hydrates could be formed if there was no water vapor present to combine with the hydrocarbons. As a consequence drying equipment was designed and manufactured to remove more completely the water and other liquids from natural gas. In the beginning, large *dehydration plants* were constructed, and gas was brought from the wells in the field to the plant, where the water was removed by several processes.

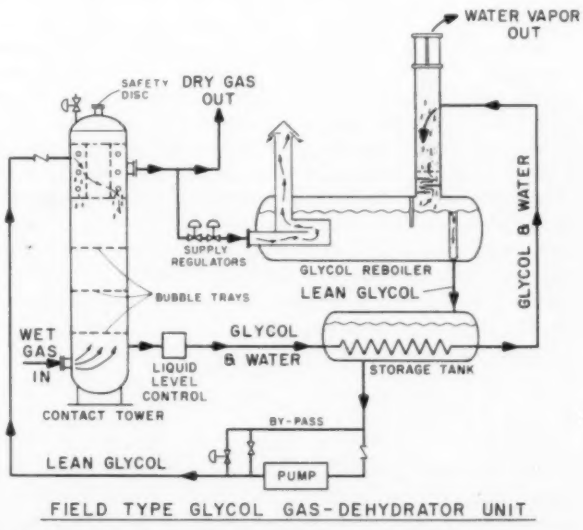
Plant Dehydration

There are several popularly employed plant methods of removing water from gas, but most of the large dehydration plants that are serving purely gas fields, are of either the *liquid desiccant* or the *solid desiccant* type. A *desiccant* is a material that has an affinity for water, and if gas contacts these materials, it will release its water vapor. The water is then separated from the desiccant by regenerative methods, enabling it again to attract the water vapors of wet gas.

The liquid-type (hygroscopic) plant as a rule employs a product called *tri-ethylene or di-ethylene glycol*. The liquid is particularly suited for its function; it not only is miscible with water, but water may be boiled out without vaporizing the glycol, as the boiling points of the two liquids vary many degrees.

Products such as glycol were being employed in the prevention of transmission line freeze-ups long before the true nature of hydrate formation had been discovered. It had been injected in the gas lines as an anti-freeze is placed in a car radiator, on the theory that blocks in the line were water ice. Naturally, then, since anti-freezing material, such as alcohol and glycols were employed in initial efforts to prevent hydrate formation, they were resorted to in an effort to remove water vapor from gas.

Many glycol plants are in operation today, but the greatest advance in the use of glycol for the cleaning of gas has



Liquid dessicant type dehydration unit.

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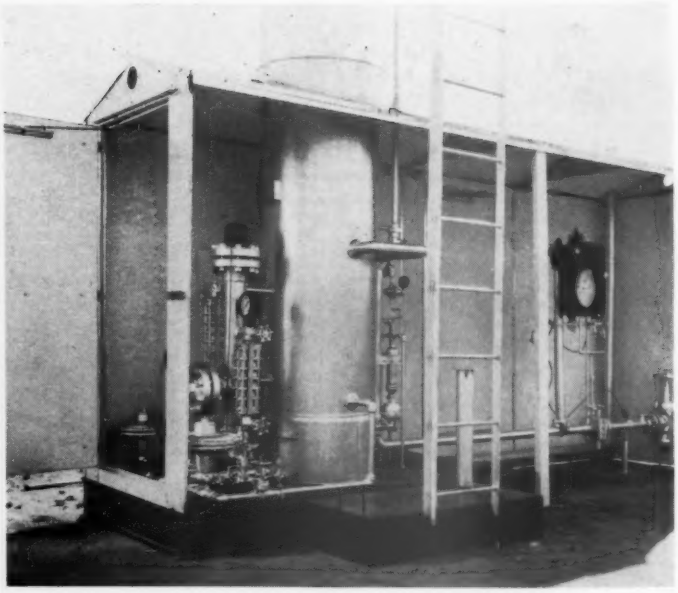


Package-type solid dessicant unit for field application.

occurred in the development of field units. These units remove water from gas at the well, thereby preventing the blockage of gathering system lines.

Obviously, even though large dehydrating plants were in operation, if the gas gathering system became blocked, the gas could never be transported to the plant for cleaning. This blocking of field gathering lines became more of a problem with the discovery of high-pressure gas wells. It was impossible to decrease the well pressure to the gathering system pressure without a corresponding decrease in gas temperature. When this temperature fell below the hydrate forming point, as it often did in the winter months, gathering lines were clogged.

The second type of dehydration plant used to remove water vapor from natural gas is the solid desiccant type, which uses drying agents such as *activated bauxite, silica gel,* and *activated alumina.* Natural gas containing water vapor is passed through beds of this material and the water vapor is removed. As the beds become saturated, hot gas is passed in reverse direction, carrying water away. The beds are thereby prepared for further use. The water-laden hot gas is cooled, causing its water vapors to condense and drop out.

As more and more high-pressure gas wells were drilled, it became evident that some type of portable gas cleaning device would facilitate the transportation of high-pressure gas through the field gathering system. Many fields became equipped with portable glycol-type dehydrators located near gas wells. The dehydrator operates automatically and may serve one or more wells, depending upon the capacity of the unit.

This portable glycol unit dries the gas, while water vapor is boiled from the glycol in one continuous cycle. The production rate of the gas well and the capacity of the unit are synchronized to insure a relatively "dry" glycol being presented to the wet gas at all times.

Operators visit the unit at intervals to check the "dew point" of the dry gas. Adjustments to the unit are made so that gas not containing an excess of 7 lb of water per 1,000,000 ft will be delivered to field or transmission lines. *Dew point* of a gas is the temperature at which the natural gas (at a specified pressure) will be saturated with water. Some large installations are automatically controlled by *dew point testers,* which withdraw samples from the dry gas stream at regular intervals. When water content of the gas is shown to have reached a specified point, the gas stream is shifted from one drying tower over to another.

Gas Heaters

Many operators, instead of trying to depress the hydrate formation point by the addition of glycol and alcohol, or attempting to prevent the formation of hydrates by removing water vapor, solve the problem by the straightforward method of increasing the temperature of the gas with the assistance of *heaters.*

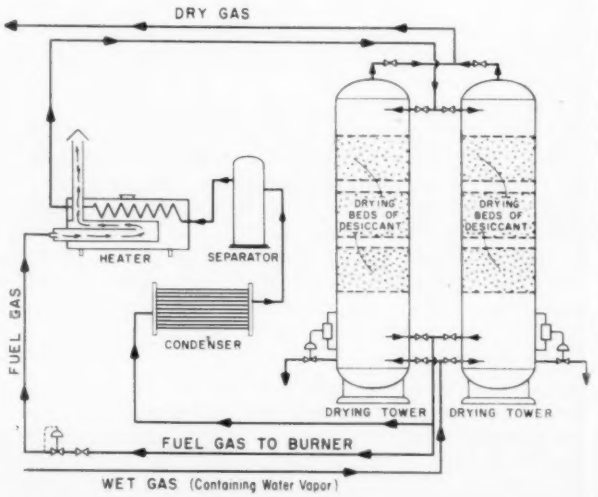
The gas-heater is usually installed near the well, far enough away to avoid becoming a hazard, but not so far that the gas will lose its heat and freeze before reaching the heater. High-pressure gas enters the heater through an adjustable choke. The nozzle of the choke is extended inside the shell, which contains water, and the water is heated by a fire box in which are installed gas burners. Fuel for the burners is taken from the high-pressure line, and reduced to a pressure of approximately 30 psi.

Fuel supply to heater burner is taken from gas line upstream, with the choke permitting the operator to light the burners and properly heat its water before the choke is opened. High-pressure gas forced through any restriction, such as a choke, is expanded. As it expands, it loses heat. If the choke is not jacketed by warm water, hydrates will form at the point of expansion, and the choke will be clogged, closing off gas flow.

The necessity of reducing high-pressure gas from several thousand psi to 30 psi for burner fuel gas may become complicated, inasmuch as each reduction in pressure lowers the temperature of the gas, thereby increasing the likelihood of hydrates being formed in the supply regulators. If these regulators freeze, no fuel can reach the burners, and the inlet choke may be also blocked with hydrates from loss of heat caused by expansion.

To prevent this possibility, supply fuel lines are often run through the warm water of the heater before a pressure reduction is taken. Some gas heaters are equipped with two or three small volume regulators, and the pressure of supply gas is reduced in stages to prevent an interruption of fuel to the burner.

The function of the heater is to increase the temperature of the stream of well gas to the point that it can safely be transported in underground lines during cold weather, even after the pressure has been reduced by the adjustable chokes.



Solid dessicant type dehydration unit.

Field gas heaters in the Carthage Field of East Texas.

In underground gas gathering lines, water is likely to collect in low places. If natural gas is forced over or through these low places, all of the requirements are met for the formation of hydrates. If the gas is warm enough, however, it will never reach a temperature at which gas hydrates form, and consequently no blockage will occur.

Many gas fields are equipped with gas-heaters, and no additional precaution is taken against the possibility of hydrate formation. The heater suffices until the gas is measured and reaches the central dehydration plant. Heaters of this type are employed in many Texas gas fields, such as the Hasting and Woodlawn fields. The heaters are equipped with thermostat and automatic shut-off valves to avoid overheating and to circumvent costly accidents.

Cold Separation

Liquid hydrocarbons and condensate are usually removed from natural gas. This removal was first done by centrally located *compressor and stripper plants*. Transmission lines operators found that dry gas, from which both water and liquid hydrocarbons had been removed, was easier to transport, and operators found that natural gasoline, condensate, and liquefied petroleum gases, such as butane, pentane, and propane were very valuable. As a consequence, efforts were made, and equipment designed, to remove both water and hydrocarbon liquids from the gas.

Engineers faced with this problem were not slow in utilizing knowledge given them by Hammerschmidt, Deaton, and Frost. They reasoned that they could induce hydrate, which in the past had given them so much trouble, to go to work for them. Inasmuch as it contained both water and gas, it was evident that the water vapor could be removed from natural gas by the simple process of manufacturing hydrates. When all water in the gas had been used for hydrates, then the gas would be dry, free of water, and could be transported with ease and without fear of troublesome ice blockage.

The problem was to dispose of the hydrate after it had been formed. This they accomplished by first determining the temperature at which the gas would form a hydrate. By the use of heaters, heat exchangers, and other equipment, they are able to deliver the gas to a choke at a temperature only several degrees above the point of hydrate formation.

The gas delivered at this point is planned to be at wellhead pressure of several thousand psi. As the gas passes through the choke, it expands. As it expands, it loses pressure and its head is dissipated to the surrounding walls of a hydrate formation chamber. The hydrate crystals, being heavier than gas, fall from the gas stream, taking water vapor with them. These crystals are allowed to fall on warm coils, where they melt, separating into water and liquid hydrocarbons. Liquid level controllers automatically drain water to a pit, and liquid hydrocarbons to a tank. The dry gas is sent to the transmission line, free of its troublesome water vapors.

There is a great loss of heat at the choke, and often it is clogged with hydrates and fails to function. To prevent this freezing, the choke is jacketed with a covering and warmed with gas from the well stream. In the event there is not enough heat present in the well stream gas, a heater is installed and the gas is heated. In this way, water is removed from natural gas at the same time the pressure is reduced, and no attendant blockages prevented the movement of the gas to the transmission system.

Glycol Injection System

As the cold separation method of dehydrating gas and removing liquid hydrocarbons evolved, refinements began to appear. The system that depended primarily on the formation of hydrates for water removal was limited, in that pressure could not be decreased beyond a certain point. If a great pressure reduction was made at the choke, the temperature of the reduced gas would fall many degrees, the hydrate forming chamber would freeze and the metal would be cooled to a brittleness which might cause it to fail under pressure.

To offset these restrictions, the walls of the vessels are made from special alloy steels, thickened and strengthened. As a further refinement, the formation of hydrates was prevented by the addition of glycol. *Glycol injection* was

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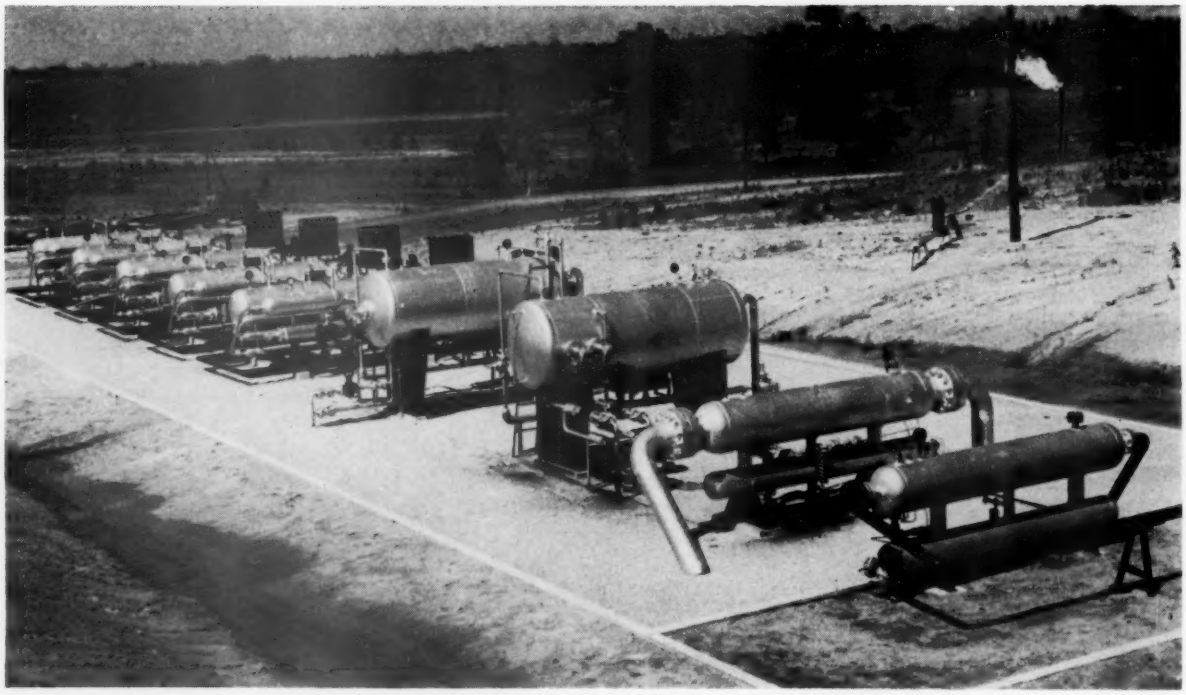


Bank of cold separator units at centrally located separation plant serves large group of gas wells.

made on the theory that water vapor and certain hydrocarbons condense at low temperature, changing from a gaseous to a liquid phase. These liquids would freeze except for the presence of injected glycol.

Prevented from freezing into solid particles, the liquids (water, liquefied petroleum gases, and glycol) settle to the bottom of an expansion chamber. With glycol injection there is no formation of ice particles or gas hydrates. The glycol, which mixed with water, may be drawn off and regenerated, then used again. The liquid hydrocarbons are stored.

Stabilizers

At this point it became evident that liquid hydrocarbons, upon reaching storage tanks, tend to take heat from the atmosphere. With increases in temperature, they begin to "boil," and some of the gases are returned to the vapor phase to be lost to the atmosphere. As the light vapors boil from the hydrocarbon liquids, they take with them many heavier vapors. Not only are the light vapors lost, but also liquid oil that would have remained in solution had not the rapidly moving gases carried it away.

To offset this loss of valuable liquid hydrocarbons, equipment was devised to stabilize cold liquid. One device is called the *cold feed stabilizer*, to distinguish it from other types that are fed with warmer liquids. The cold feed stabilizer operates under pressure that is held by a back-pressure valve on the vapor outlet line. The cold liquid falls through trays and upon reaching the bottom of the tower, it is heated. Light vapors are driven off as the liquid is heated, and these vapors rise through the tower, passing over the incoming cold liquid.

The liquid that settles to the bottom is drained off and sent to a glycol-condensate separator. The hydrocarbon condensate is sent to storage and the glycol is boiled to dispel water and is then used once more. The distillate that goes to storage flashes very little after this stabilizing operation.

In this manner, all parts of the natural gas stream that comes from the well are utilized. Light ends go to the butane and propane tanks; distillate goes to distillate storage, and the dry natural gas is sent to the transmission lines.

Storage of Gas and Liquid Products

In the past, gas was wasted because there were no facilities for its storage. Gas was also wasted in the "cleaning" of wells, and gas was allowed to flow to encourage oil production. Much sweet gas (gas containing no sulfur) has been used to make carbon black. The demand for petroleum and its products becomes greater each year, and the economy in many countries rests upon an adequate supply of petroleum. Consequently, efforts have been made to safely store liquefied petroleum gas and dry gas in large quantities.

Depleted gas fields have been envisioned as natural storage vaults. Gas has been injected into water sands that once held gas, and in some instances into water sand which never held gas before. Gas storage has been accomplished in many fields, notably Hasting field, Texas; Doe Run and Muldraugh fields of Kentucky; Depew in Oklahoma; and in Westmoreland County, Pennsylvania.

Producers, seeking underground storage for butane and propane, have washed out cavities in salt beds with warm water, and used these earthen containers for gas storage. In 1950 at Kermit, Texas, a salt bed was utilized in this manner.[5]

Underground storage, field processing units, and wide spread markets for natural gas, in addition to an ever-increasingly growing net work of pipelines, are factors that will tend to decrease the waste of natural gas and to increase its availability to mankind.

Acknowledgment

This chapter on "Natural Gas Production and Field Processing" has been prepared by Jack L. Wiggins, consultant in the firm, Compasco; formerly special training consultant for the American Petroleum Institute, and petroleum training specialist for the University of Texas, now general secretary of the National Oil Scouts and Landmen's Association.

References

4. "Gas Hydrates and Their Relation to the Operation of Natural Gas Pipe Lines," by W. M. Deaton and E. M. Frost, Jr., Monograph 6.
5. Report on Underground Storage, National Petroleum Council, April 1952.

★ ★ ★

Coming Events

IN THE GAS UTILITY INDUSTRY

October

1- 4 NACE, south central regional meeting, Municipal Auditorium, Oklahoma City, Oklahoma.

7- 9 AGA annual convention, Kiel Auditorium, St. Louis, Missouri.

10-12 ASME Fuels-AIME conference, Chateau Frontenac, Quebec, Canada.

16-18 Wisconsin Utilities Association, annual convention, Schroeder Hotel, Milwaukee, Wisconsin.

21-25 National Safety Council, Conrad Hilton Hotel, Chicago, Illinois.

23 NEGA street department supervisors group, Hotel Bancroft, Worcester, Massachusetts.

November

4- 8 National Metal Exposition, Chicago, Illinois. (AGA will exhibit.)

6 NEGA Operating Division, Hotel Statler, Hartford, Connecticut.

11-14 American Petroleum Institute, Conrad Hilton Hotel, Chicago, Illinois.

11-15 National Electrical Manufacturers Association, Traymore Hotel, Atlantic City, New Jersey.

11-15 National Hotel Exposition, Coliseum, New York. (AGA will exhibit.)

13-15 ASA eighth national conference on standards and thirty-ninth annual meeting, San Francisco, California.

18-21 10th exposition of air conditioning and refrigeration industry, International Amphitheatre, Chicago, Illinois.

18-22 National Warm Air Heating and Air Conditioning Association, Hotel Morrison, Chicago.

December

1- 6 ASME, annual meeting, Hotel Statler, New York.

2- 4 Institute of Appliance Manufacturers, Shoreham Hotel, Washington, D. C.

4 NEGA appliance servicing conference, Hotel Bancroft, Worcester Massachusetts.

5 NEGA appliance servicing conference, Hotel Statler, Boston, Massachusetts.

January 1958

23 NEGA Operating Division, Hotel Statler, Boston, Massachusetts.

27-29 American Society of Heating and Air Conditioning Engineers, annual meeting, Pittsburgh, Pennsylvania.

March 1958

17-21 National Association of Corrosion Engineers, San Francisco, California.

20-21 NEGA, annual meeting, Hotel Statler, Boston, Massachusetts.

24-26 Mid-West Gas Association, Broadmoor Hotel, Colorado Spring, Colorado.

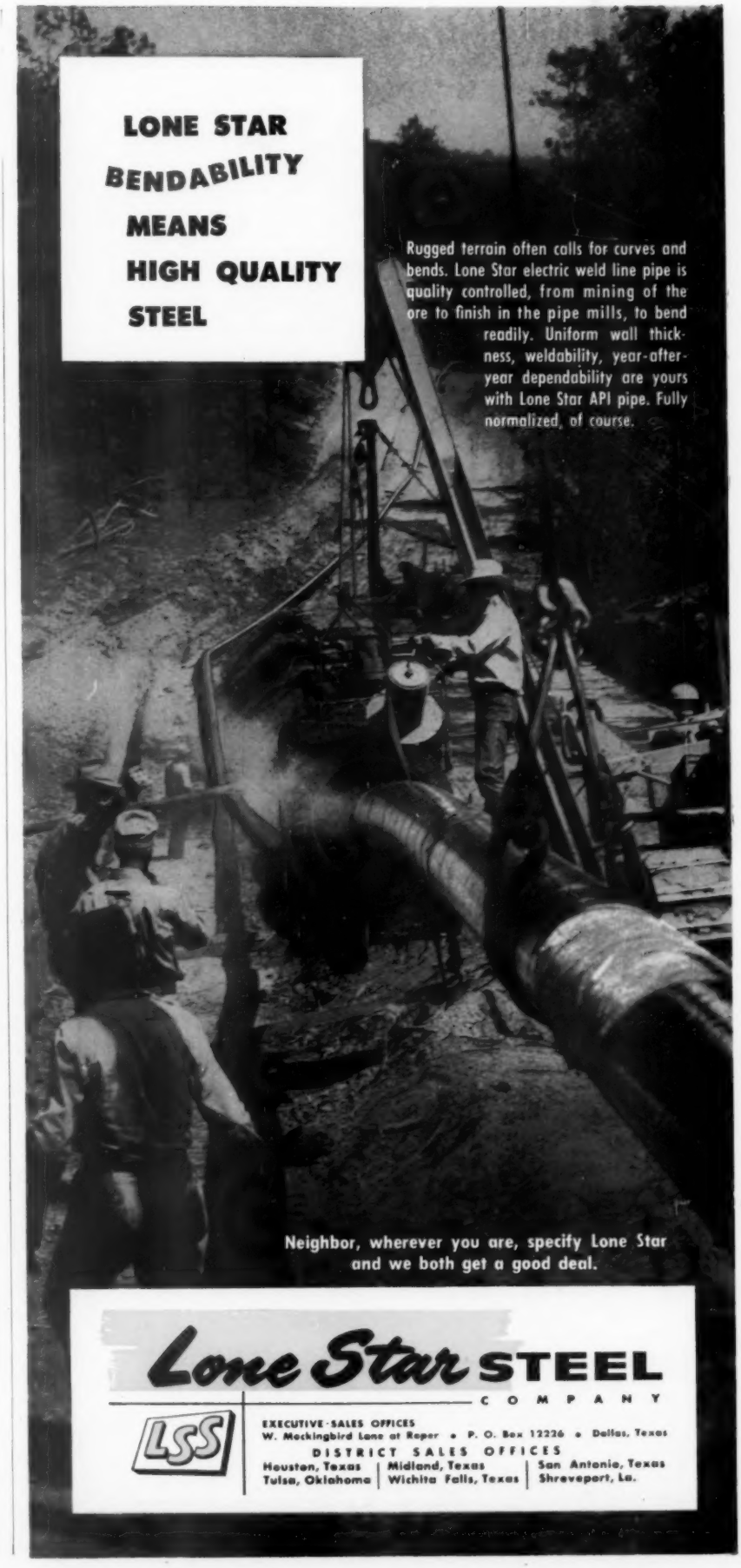
31-April 2 GAMA, annual meeting, Greenbrier, White Sulphur Springs, West Virginia.

April 1958

8-10 AGA sales conference on industrial and commercial gas, Hotel Schroeder, Milwaukee, Wisconsin.

14-16 National Conference of Electric and Gas Utility Accountants, Shamrock Hilton Hotel, Houston, Texas.

28-30 SGA annual convention, Dallas, Texas.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NEWS ABOUT THE GAS UTILITY INDUSTRY

Gas Firm Formed in Canada. Jack K. Horton, vice president of Pacific Gas and Electric Company, has been elected president and chief executive officer of Alberta and Southern Gas Company, Ltd., a newly-organized company which will purchase surplus Canadian natural gas for the California market. Formation of the company and election of its officers are the first major step in recently announced plans for a $330,000,000 transmission project to augment California's gas supplies with Canadian gas, beginning in 1960. Six Americans and seven Canadians were named to the board of directors including: James B. Black, chairman of the board of PG&E who was named chairman; S. M. Blair of Toronto, president of Canadian Bechtel who was named vice chairman; N. R. Sutherland, president and general manager of PG&E; R. H. Gerdes, J. S. Moulton and P. E. Beckman, all PG&E vice presidents; Ross MacKimmie, J. E. A. MacLeod, C. O. Nickle and R. L. Winton, all of Calgary; and H. R. Milner and D. K. Yorath, both of Edmonton.

Gas Industry Poster Campaign. Julia Meade will be featured on the AGA's gas industry poster campaign in 1958. Member companies will use nearly 3000 billboards in 200 utility areas in the U. S. during 1958 in seasonal sales promotion campaigns featuring the industry's television hostess on "Playhouse 90."

Safety Manufacturer Forms Subsidiary in Mexico. Mine Safety Appliances Company of Pittsburgh, has announced the formation of Mine Safety Appliances de Mexico, S. A. de C. V. with headquarters in Mexico City. C. M. Donahue will be president of the new firm. Arch S. Abbey, Latin American sales manager of the parent firm, will be general manager. Offices, manufacturing facilities, and a warehouse are being established in Mexico City.

Commendation. Auburn Smith, left, industrial engineer for the Ohio Fuel Gas Company, was recently presented with a commendation from Columbus, Ohio's Division of Smoke Regulation and Inspection by Harold C. Johnson, chief smoke regulation engineer. The award was presented following the tenth meeting in a series of clinics by Smith devoted to the understanding and efficient use of commercial and industrial natural gas boilers, consuming 1000 cu ft per hour, or more.

Gas At the Metal Show. Dominating one side of the giant arena of the International Amphitheatre of Chicago during the week of November 4 will be the Combined Industrial Gas Exhibit featuring the latest applications of gas heat to industrial processing. Members of the American Society for Metals and visiting industrial gas engineers from all over the U. S. and Canada attending the show will see what is new in equipment and controls. Selas Corporation of America plans a display of three gas-fired furnaces in actual operation to demonstrate heating for forging, brazing and high temperature laboratory investigation. Visitors will be able literally to look into a high-speed direct-gas-fired furnace in operation.

Washer Called Measuring Stick. Rapidly growing use of automatic clothes washers has made obsolete the past methods of determining the type of hot water service a home should have, according to John J. McKearin, general sales manager of Laclede Gas Company. Speaking at the fourth annual meeting of the American Home Economics Association in St. Louis recently, McKearin said that the automatic clothes washer has set new standards for automatic water heaters and has become a simple measuring stick for automatic hot water service. The measure, he said, can be referred to as laundry rating or recovery rating. Either of the two "simply means the number of gallons an automatic water heater will heat per hour through a temperature rise of 100 degrees."

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Dresser Sets Up Plastics Department

A Plastics Products Department has been created by Dresser Manufacturing Division, Dresser Industries Inc., Bradford, Pennsylvania, to develop and market plastic products for the joining, repairing and maintenance of pipe. Several products in this line will soon be announced for sale. S. B. Hodges, marketing manager, will coordinate activities of the new department for Dresser.

One line of plastic products under the trade name Epi-Seal has already been offered by Dresser for a variety of pipe repair applications. Manufactured for Dresser by Bonded Products, Inc. of New Jersey, Epi-Seal products are epoxy resin compounds which are finding many uses, particularly in the gas industry, for the repair of underground pipe and joints.

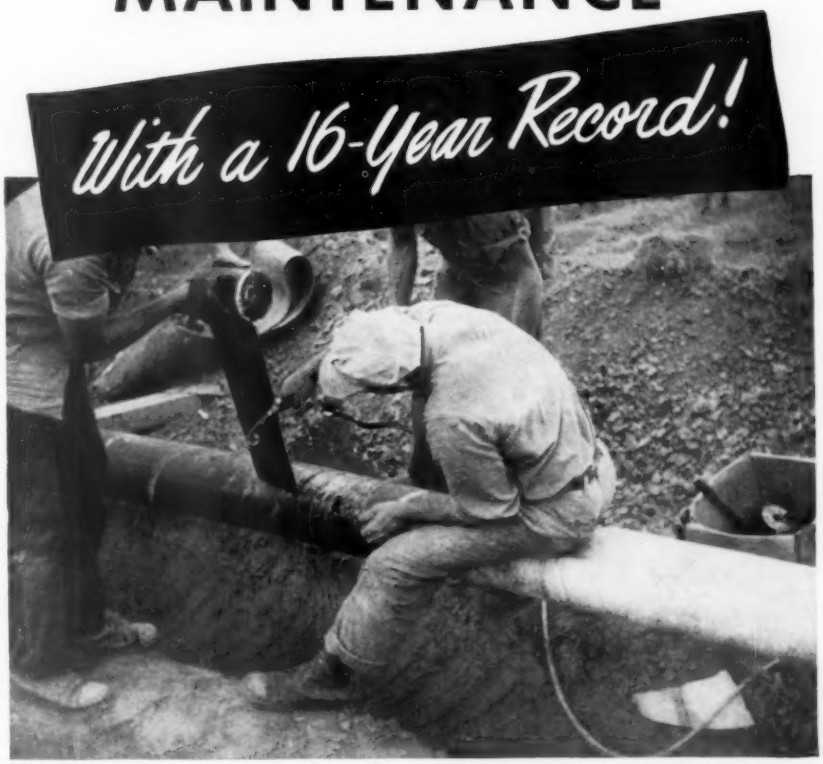
Coincident with the establishment of Dresser's new Plastics Products Department was the announcement by Bonded Products, of the election of H. Z. Hight, regular products sales manager of Dresser since 1945, to the position of president. Hight has worked closely for the past 20 years with piping problems of the gas, oil and pipeline industries. For the past three years he has coordinated oil phases of Dresser's planning for plastics research and will continue to work with Dresser on a number of projects being pursued jointly by Dresser and Bonded Products as part of a large development program. In addition, he will continue as a consultant on the marketing of plastics and other Dresser products.

New Printing of Safety Manual. Increased demand for the safety manual on installation and servicing of gas appliances has prompted the AGA to prepare a supplemental printing of the illustrated booklet first made available serveral months ago. Approximately 25,000 booklets, compiled by the distribution and utilization subcommittee of the AGA accident prevention committee are already being used by the customer service departments of more than 200 utility companies in the U. S. and Canada. Titled, "Suggested Safe Practices When Installing and Servicing Gas Appliances," the manual gives detailed instructions on 11 types of gas appliances: Including conversion burners, furnaces and boilers, floor furnaces, radiant fires, ranges, refrigerators, clothes dryers and incinerators.

New Company Address. Robertshaw-Fulton Controls Company has announced that its executive offices will occupy the entire top floor of the Life Insurance Company of Virginia building in Richmond, Virginia. Continuing to be headquartered at the Greensburg, Pennsylvania, office will be the chairman of the board of directors and the company's international operations.

Correction. Inadvertently, an acknowledgement appeared at the end of the article on "Punched-Card System, Computer Speed Billing, Accounting Procedures," by W. Alfred Pearce, on pages 23-24 of the September issue of American Gas Journal, stating that article was developed from a talk given at the AGA Distribution Conference. This is not correct — this article was prepared exclusively for AGJ; our apologies for this error.

PREVENTIVE MAINTENANCE



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News About Associations

AGA **Award Initiated.** First annual AGA Industrial-Commercial Achievement Award will be presented at the annual AGA convention to be held October 7-9 in St. Louis. The award, consisting of $500 and a certificate, will honor annually the individual having made "an outstanding personal contribution to the gas industry which has enhanced the use of gas for industrial and commercial purposes." Such a contribution may be in research, invention, sales, advertising, safety, customer relations, and any other activity promoting the development of industrial and commercial applications of gas.

GAMA **Hammond, Kern To Direct Western GAMA Unit.** Paul H. Hammond, vice president of Holly-General Company, Pasadena, has been selected to head the Gas Appliance Manufacturers Association section of the Pacific Coast Gas Association for the second consecutive year. J. E. Kern has been appointed director of manufacturer programs of the PCGA. He will direct an expanded manufacturers' promotion program on the West Coast designed to stimulate gas appliance sales.

GAMA Accepts Three New Members. Three companies elected to membership in the Gas Appliance Manufacturers Association are: Franklin Lumber & Fixture Company, Division of N. Wasserstrom & Sons, Inc., manufacturer of dry-heated hot food tables for hotel and commercial use; Rosander Company, producer of gas commercial coffee makers, and Lucas-Rotax Ltd., manufacturer of gas hot water heating boilers and warm air furnaces.

AGA **Safety Flipcharts Introduced by Accident Prevention Committee.** At the ninth annual AGA Accident Prevention Conference held recently in St. Louis, a graphic new approach to safety education in the gas industry was taken by the AGA with the publication of a nine-part Safety Flipchart program. Prepared by the accident prevention committee in cooperation with the National Safety Council, the flipcharts have been designed for use as a complete safety program or as supplemental material for safety programs already in operation.

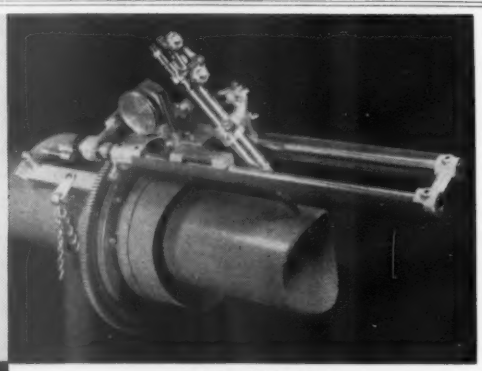
PCGA **Gueffroy Named President.** C. H. Gueffroy, president of the Portland Gas and Coke Company has been elected president of the Pacific Coast Gas Association, succeeding T. T. Arden, president of Robertshaw-Fulton Controls Company, at the 64th annual convention of the association. R. R. Blackburn, senior vice president of the Southern California Gas Company was named vice president and Harry McGann, Pacific Gas and Electric Company was elected treasurer.

SGA **Western Area Round Table.** Carrington Mason of the Houston Natural Gas Corporation served as the sponsor for the recent Southern Gas Association western area round-table conference on distribution operations and maintenance. Seven major topics discussed at the round-table included extension and service policies; employee training; policies affected by the ASA B31.1 Code; construction, maintenance; services and plastic pipe; and meters and regulators.

SGA Home Service Conference—Thirty-one representatives of 15 companies attended the Southern Gas Association home service conference held in Houston

recently. Conference chairman was Laverna Best, home service director for the Houston Natural Gas Corporation. For the first time in several years, the home service meeting was held in the form of a round-table conference in lieu of the usual workshop. Topics covered on the agenda included dealer programs; home calls; range promotion; demonstrations; Mrs. America contest; Servel promotion training and management.

Torch control



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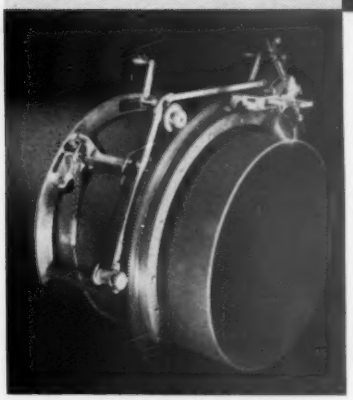

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Men At Work IN THE GAS UTILITY INDUSTRY

● **Elmer Gates** has been appointed manager of the rate department of Middle West Service Company, business and engineering consultants of Chicago.

● Southern Counties Gas Company of California has promoted three executives following its veteran Santa Barbara division manager **George W. Smith** going on disability September 15 due to failing health. Succeeding Smith at Santa Barbara is **Thomas N. Banks,** formerly superintendent of the San Gabriel Valley division. **Monte S. Christie,** superintendent, Santa Barbara division, will succeed Banks, while Christie's post will be filled by **Fred B. Bennett,** distribution supervisor, San Gabriel Valley division.

G. W. Smith

T. N. Banks

M. S. Christie

F. B. Bennett

● **Earl Kirmser** has been appointed director of public relations of Rheem Manufacturing Company. **James N. Krohne** continues in Chicago as associate director of public relations, working largely with the Rheem division and domestic plants.

● **Gilbert D. Doroff** has been promoted to national sales manager, mobile products, and **Frank R Viafora** will replace Doroff as midwest regional manager for two-way mobile products of Bendix Radio Division of Bendix Aviation Corporation.

● **Leroy (Jerry) E. Jirikovec** has been appointed manager of the Gainesville property of Georgia Gas Company, a division of United Cities Gas Company.

● **Clair H. Lewis,** senior engineer with the Columbia Gas System, retired this month after 40 years of service with the organization.

● In recognition of the growing importance of utilities in the marketing of home laundry appliances, a new department has been created in the Maytag marketing division designed to coordinate relationships with utilities. **B. B. Turner** has been named manager of utility relations to head this new department. He will serve as liaison between Maytag and utility companies across the nation.

● **Theodore D. O'Hearn** has joined the Appliance Division of Motor Wheel Corporation as assistant advertising manager.

● **Theodore S. Petersen** has been named sales manager for the Quick-Way Truck Shovel Company of Denver, Colorado. He succeeds **Daniel S. Heffron** who resigned recently.

● **Edgar A. Dunham, Jr.,** has been appointed eastern gas utility representative for Norge Division, Borg-Warner Corporation. He reports to **E. A. Nash,** director of gas appliance sales.

● **Courtlandt S. Gross,** president of the Lockheed Aircraft Corporation, has been elected a director of the Southern California Gas Company.

● **Clyde D. Alstadt,** supervisory engineer in the gas engineering department of the Columbia Gas System Service Corporation, has retired after 40 years service with many of the system companies.

● **Vern Davis Butler** has been named district manager of Southern Union Gas Company's El Paso-Alamogordo district office. He was previously in charge of the El Paso local office.

● **W. H. Brown** has been appointed general manager of the Ohio Valley Gas Corporation in Winchester, Indiana. He succeeds **W. E. Hiatt** who was president and general manager for nine years.

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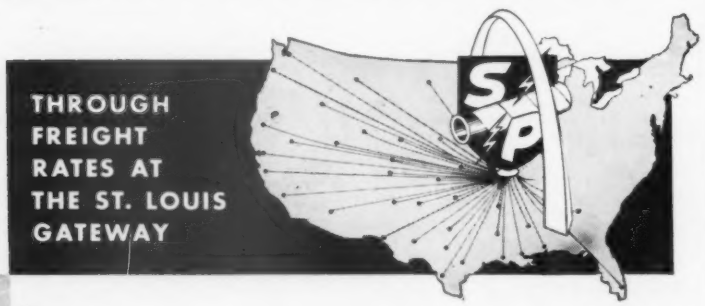
STEEL GRIT Makes the Difference!

This steel grit with its sharp edges is hurled at very high speed against the rotating pipe, thereby removing every trace of dirt, mill scale and rust. In addition, the steel grit forms many tiny facets on the surface of the pipe. When the primer is immediately applied to the roughened surface of the warm pipe, the strongest bond possible is achieved.

Other methods of cleaning are less efficient and leave a semi-polished surface on the pipe, resulting in weaker bond.

Steel grit cleaning is the first very important step in obtaining the strongest bond of coatings and wrappings. At Standard Pipeprotection Inc., every piece of pipe is steel grit cleaned.

REMEMBER . . . YOU CAN JEEP ENAMEL, BUT YOU CAN'T JEEP BOND.



standard pipeprotection inc.

3000 SOUTH BRENTWOOD BLVD. • ST. LOUIS 17, MISSOURI

Personals

● **Charles W. Stewart** has been appointed assistant to the president of Lancaster Meter Parts Company. He was formerly chief engineer of Sprague Meter Company.

C. W. Stewart

P. H. Spennetta

● **P. H. Spennetta,** former chief of research and testing for the Caterpillar Tractor Company, has joined the engineering staff of J. I. Case Company as director of engineering for the industrial division.

● **Charles T. Carolan,** assistant treasurer, Suburban Propane Gas Corporation, and **Douglas G. Simpson,** controller, Trans-Canada Pipe Lines Limited, have been elected to membership in the Controllers Institute of America.

● **Mark R. Darmer,** special assistant to the sales vice president of the Coleman Company, Inc., has been named to succeed Leland C. Ginn as manager of the Dallas branch sales offices. Ginn died only a few weeks after he had established the Dallas offices.

● **Carl O. Knierim** has been appointed manager of heat treat sales for The Gas Machinery Company. Knierim was formerly chief engineer for the Industrial Furnace Division.

● **J. N. Clayton Jr.,** has been appointed manager of the rate and regulatory department of Arkansas Louisiana Gas Company. He succeeds **M. D. LaGrone,** who has resigned to become treasurer and vice president of Consolidated Gas Utilities Corporation of Oklahoma City.

● **R. E. Kittoe,** formerly sales engineer in the St. Louis office of Combustion Control Division, Electronics Corporation of America, has been appointed area manager of the new Charlotte, North Carolina, office.

● **C. F. (Chet) Carney** has been appointed sales manager of Bastian-Morley Company, Inc. Formerly, he was district manager in Ohio and Pennsylvania.

● **E. C. Saunders** has been appointed to the newly-created post of customer accounting supervisor of San Diego Gas & Electric Company.

William Russell Mabee

William Russell Mabee, vice president and assistant general manager of the Tappan Stove Company, died September 3 at his home in Mansfield, Ohio, following a heart attack. He was 48.

Paul Howard

Paul Howard, district manager of Georgia Gas Company for 15 years at Gainesville, Georgia, died June 26 of a heart ailment. He was 45.

Personals

● **Thomas N. McCarter** has resigned as a member of the board of directors of Public Service Electric and Gas Company because of ill health.

● **James A. Scanlon,** vice president of Columbia Gas System Service Corporation, has been elected to the board of directors of that corporation. He has also assumed the duties of vice president-rates following the retirement of **E. R. Conner.**

J. A. Scanlon

● **Orville S. Carpenter,** president of Texas Eastern Transmission Corporation, has been elected to the board of directors of the American Gas Association. He fills the unexpired term of **George T. Naff,** vice chairman of Texas Eastern, who resigned from the board.

● **Jack A. Bell,** sales promotion manager for Alabama Gas since 1948, has resigned from the company to accept the position of general sales manager of the Gas Light Company of Columbus, Georgia.

● **C. S. Pinkerton** has retired from his sales post at Cutler Hammer, Inc., after 43 years of service.

● **John T. Bills** has been elected vice president of Peoples Gas System of Florida. He fills a new executive post, vice president-corporate relations, created by the board of directors to administer the system's multi-million dollar expansion program.

● **Louis E. Dondero** has been named manager of the West Allis plant of the Le Roi Division, Westinghouse Air Brake Company, succeeding **Hugh M. Little.**

● **Louis G. James** has been elected a vice president of Lone Star Gas Company and its wholly-owned subsidiary, the Lone Star Producing Company. He will continue to hold the post of comptroller.

● **William D. Stroben** has been appointed director of advertising for Norge Division, Borg-Warner Corporation. He will be responsible for national and cooperative advertising on Norge home appliances.

● **Patrick N. Morgan** has been named assistant to the vice president and general sales manager of the Heater & Tank Division of John Wood Company.

● **Roy E. Wright** has been appointed director of gas and electric sales for the NEGEA Service Corporation of the New England Gas and Electric Association. **Frederick A. Schloman** has been appointed assistant director of gas and electric sales for the corporation.

● **Paul A. Manor,** chief engineer of Rockwell Manufacturing Company's Barberton, Ohio, valve division, has been promoted to chief engineer, central valve research and development department at Pittsburgh.

● **Fred W. Argue,** vice president and engineering manager, and **Edward J. Ford,** vice president and senior construction manager, of Stone & Webster Engineering Corporation have been elected directors of the firm.

● **W. E. Staff Jr.** has been named supervisor of the new eastern district office of Bendix Aviation Corporation's computer division. The new district office will handle sales, service, and applications of Bendix's electronic computer and accessories in the New York area.

● **Ralph W. Moore,** active in the heating and refrigeration industry for over 10 years, has recently joined the sales department of Detroit Controls Division of American-Standard, and will be headquartered in Charlotte, North Carolina.

● **Joseph W. Greene** has been elected vice president of sales for Crane Company. He will head a realigned department organization that will coordinate industrial, plumbing, and heating-air conditioning sales previously conducted on a divisional basis. Crane's nationwide merchandising-distribution system, which includes company owned branch houses in 141 cities in U. S., will be operated under the new sales vice president. He will also be responsible for the direction of Crane marketing research and advertising-sales promotion activities.

● **Clifton W. Corbett** has been appointed assistant to the manager, Drier, Oven, and Lehr Division of Selas Corporation of America.

● **W. E. Steinwedell,** one of the founders of The Gas Machinery Company in 1902, has retired from active service after 55 years on the board. He has been named honorary chairman of the board and remains a consultant to the company. Other personnel changes include: **Elliott Donnelley** of Lake Forest, Illinois, and **William Steinwedell** of Wilmette, Illinois, who have been added to the board of directors.

● **Stan C. Marshall** of Minneapolis-Honeywell Regulator Company has been elected to the presidency of the Gas Appliance Engineers Society. Other new officers are: Vice president, **D. R. Weidenfeller,** of Baso, Inc.; treasurer, **Keith T. Davis,** of Carrier Corporation, and trustee for a three-year term, **M. J. Caparone,** of Grayson Controls Division, Robertshaw-Fulton Controls Company.

● Promotion of **Earl J. Weber** and **Thomas E. Hampel** each to assistant chief research engineer of American Gas Association Laboratories has been announced.

● Three executive appointments have been announced by Servel, Inc. They are: **John H. Wall,** executive vice president and general manager of the home appliance division, has been appointed general manager. **Arthur A. Pieper,** who has been controller since last March, has been elected vice president in charge of finance to succeed **William H. Schrader,** who has resigned. **Harold J. Luke,** formerly assistant to the vice president in charge of finance, has been promoted to treasurer and assistant secretary.

● **Elden P. Priebe,** assistant controller, Tennessee Gas Transmission Company, Houston, has been elected to membership in the Controllers Institute of America.

● **John R. Kleespies** has been appointed manager of the department of procedures and organization, a newly created position with Pacific Gas and Electric Company.

● **Milton J. Pfeiffer,** vice president in charge of the gas department, has been elected to the Cincinnati Gas & Electric Company board of directors. This is in accordance with the company plan to select a different officer each year to serve as a member of the board.

● **Sherman E. "Sherm" Potter,** senior supervisor in the construction and maintenance department of the Kansas City, Missouri, Division of The Gas Service Company, has been promoted to manager of the Fort Scott property. He succeeds **Frank M. Cook,** who will then become manager at Hutchinson when **Ed C. Pfenning** retires.

● **Ed Roberson** has been appointed manager of the Bremerton district for Cascade Natural Gas Corporation. He succeeds **Dave Welch** who has resigned.

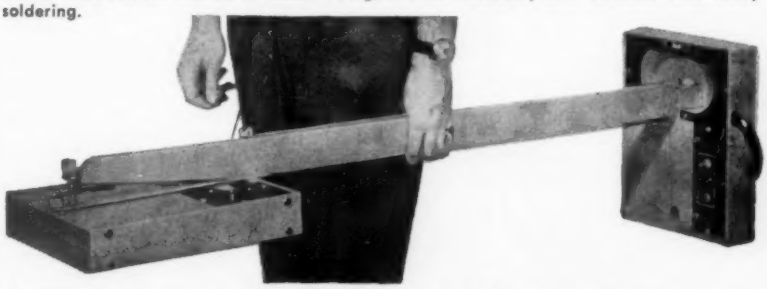
● **Bud Conway** has joined the staff of North Shore Gas Company as a dealer-sales representative.

The WILKINSON LINE LOCATOR

PREVENTS COSTLY DAMAGE

Spots all sub surface pipes, cables, etc., and determines their depth accurately.

ETCHED CIRCUITRY: instead of hand wiring, insures uniformity and freedom from faulty soldering.



BATTERY TESTER: instantly indicates battery condition without removing batteries.

INSTRUMENT CASE: Made of tough, wear resisting phenolic material. The antennas are an integral part of cases, moisture and shock proof.

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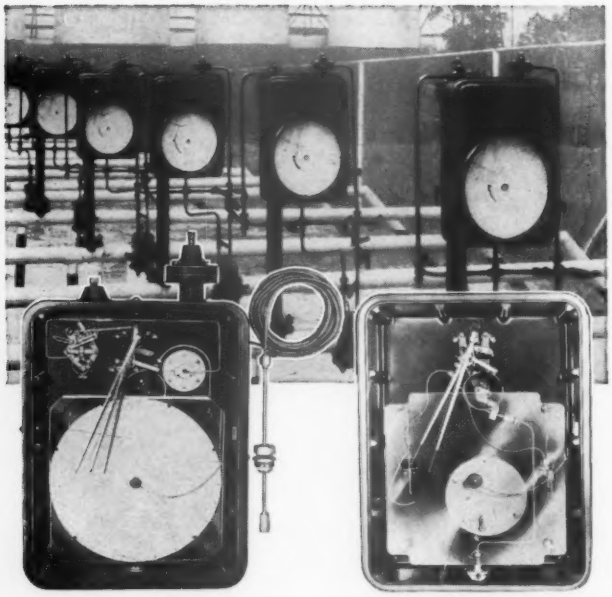
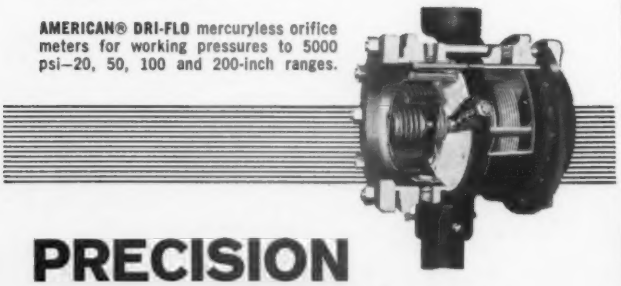


AMERICAN-WESTCOTT Series A-88 recording orifice meters for flow, pressure and temperature measurement—working pressures to 5000 psi—10, 20, 50, 100 and 200-inch ranges.

CANNON METER PENS for recording meters, available if desired, provide clear, legible chart records—hold up to a year's supply of ink.

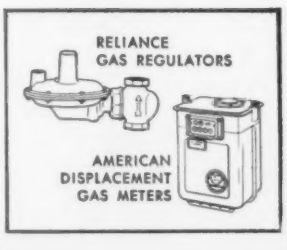
AMERICAN® DRI-FLO mercuryless orifice meters for working pressures to 5000 psi—20, 50, 100 and 200-inch ranges.



PRECISION MEASUREMENT

of flow, temperature, and pressure on one chart

Wherever precision measurement and economy of operation are required; at high or low flow rates, at varying temperatures, whether in recording, indicating, integrating or telemetering models, American orifice meters are synonymous with accurate, dependable, trouble-free service and low maintenance costs.



AMERICAN® METER COMPANY

INCORPORATED (ESTABLISHED 1836)

GENERAL SALES OFFICE: Philadelphia 16, Pennsylvania • Albany • Alhambra • Atlanta • Baltimore • Birmingham • Boston • Chicago • Dallas • Denver • Erie • Houston • Kansas City • Los Angeles • Minneapolis • New York • Omaha • Pittsburgh • San Francisco • Seattle • Tulsa • Wynnewood. IN CANADA: Canadian Meter Company, Ltd., Milton, Ontario • Calgary • Edmonton • Regina

SUPPLIERS TO THE GAS INDUSTRY for Ironcase, Tinned Steelcase, Aluminumcase and Welded Steelcase Meters • American-Westcott Orifice Meters Instruments • Reliance Regulators • Apparatus • Valves

Peak Shavings

. . . . with laughing gas

A California bank received the following brief note with a final payment on an automobile contract.

"Dear Sirs: This should make us even. Sincerely, but no longer yours."

If you're always longing for the good old days, just try reading by an oil lamp.

When billing and cooing result in matrimony, the billing always comes after the cooing.

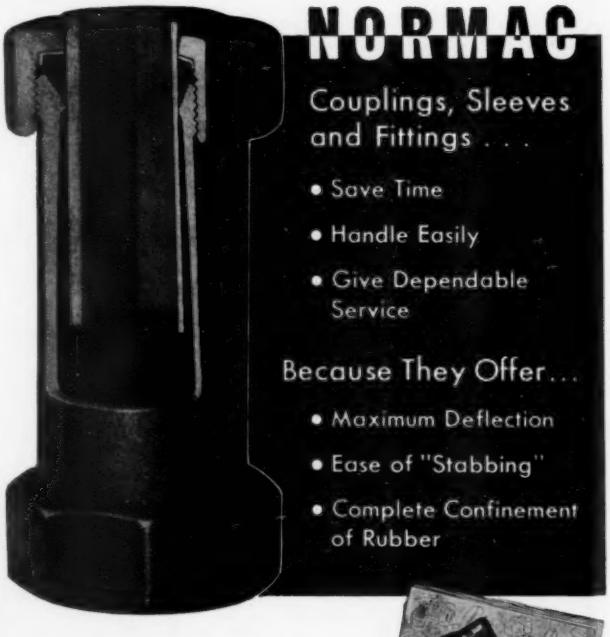
One Sunday morning a father left his small son in the pew while he went forward to partake of the Sacrament. He returned to find the boy gone. As he looked about the church, a small voice cried out, "Here I am, Dad, up at the bar."

Nothing improves a joke more than telling it to your employees.

Finding a way to live a simple life is today's most complicated job.

Men mumble in church to get married, and in their sleep to get divorced.

The best place to find a helping hand is at the end of your own arm.



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- Handle Easily
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Because They Offer...

- Maximum Deflection
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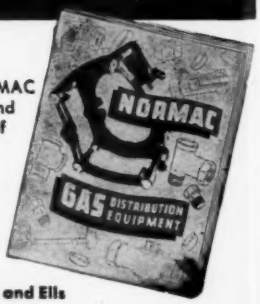
- Complete Confinement of Rubber



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Couplings • Meter Bars • Sleeves
Cocks • Ball Joint Clamps • Service Tees and Ells

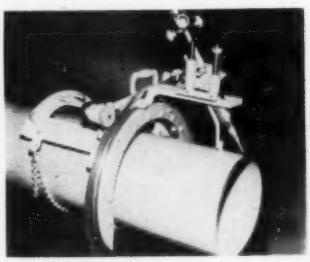
NEW EQUIPMENT
OF THE GAS UTILITY INDUSTRY

For more information on items described here in brief, use the handy reply card and circle the corresponding numbers

Compression Couplings. New line of compression couplings for connecting small pipe for utility and industrial use is now being manufactured by Joslyn Mfg. and Supply Co. Couplings are unique in design consisting of only three components: Two compression nuts with integral retaining rings and gaskets, and one steel sleeve. Easy to install, they require no thread cutting or exact pipe fittings as ends of the pipe are merely stabbed into factory - assembled couplings and the compression nuts tightened. Special construction of steel retaining rings allows nuts to be screwed up easily on the sleeve and to compress the gaskets without friction or seizure. Couplings assure leak-proof joints capable of withstanding and sealing internal pressures in excess of 3000 psi. Available in variety of metals and gasket materials to meet wide range of requirements for pipelines carrying water, oil, gases or chemicals in sizes from ¾ to 2-in. internal pipe size. *Joslyn Mfg. and Supply Co.*

CIRCLE (1) ON THE REPLY CARD

Out-of-Round Pipe Attachment. A new and improved "Out-of-Round" attachment for H & M standard pipe cutting and beveling machines is now available. Working on the spring-tension principle, the spring and a roller rod assembly are the two main components of the attachment. Unit engineered to eliminate problem of inaccurate cuts or bevels on "out-of-round," or imperfect pipe. Roller rod assembly consists of a rod that is fastened to the body of the attachment by means of a set screw arrangement, and a small diameter wheel that is affixed to the end of the rod, which travels the outer circumference of the pipe surface. The spring maintains constant pressure on the roller rod which forces the wheel to follow the control of the pipe and keeps the torch equi-distance from the pipe at all times, thus correcting for any defects in the pipe surface. More advanced design of the new "Out-of-Round" attachment embodies improved arrangement of the roller rod and spring assemblies, resulting in increased precision and accuracy when cutting or beveling pipe. *H & M Pipe Cutting and Beveling Machine Company.*

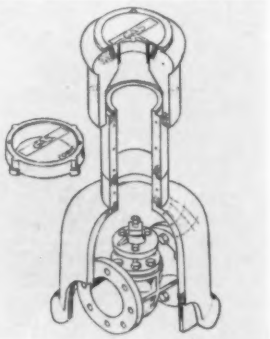


CIRCLE (2) ON THE REPLY CARD

Electro-Conductivity Analyzer. Designed for continuous monitoring of parts per million content in air of any gas or vapor which will ionize in water (or whose combustion product will ionize in water), the Davis Electro-Conductivity Analyzer may be employed either for toxic gas control in work areas, or for tracing impurity analysis in process control. Such process control applications include analyzing for residual hydrogen sulfide or mercaptans in natural gas. All units are available for either indicating, recording, or controlling. *Davis Emergency Equipment Company.*

CIRCLE (3) ON THE REPLY CARD

Street Box Housing. New type street box housing for gas plug valves are now available made of mesh-reinforced concrete instead of the customary steel. Unit costs less than $25. A centrifugally cast duraluminum ring holds the cast iron cover so it will not cause sparks. Cover cannot rust together with street box housing and is always easily removed. Grade adjustment is simple, since the box telescopes over the extension. Ring at the top locks with the road surface so box is always flush with the top of the paving. *George P. Forni Company, Inc.*



CIRCLE (4) ON THE REPLY CARD

Desk In Your Car. An 8 by 12-in. desk or writing platform for use in two-way radio truck and service cars is now available from the Product Development Corporation. Desk has a one inch deep basket welded underneath the platform that is enclosed on three sides. The fourth side is fitted with a retaining spring to prevent completed paper work from being lost. Removal of the ball point pen from the holder on the desk releases the spring and papers are easily accessible. Sturdy spring clip retains undelivered papers in delivery sequence on the top of the desk. Desk mounting bracket is secured to the bottom of the dashboard flange by a self-threading screw, and may be adjusted sideways, backward or forward. Desk may be slipped off the "U" mounting bracket so the driver may take it to the point of delivery. Desk light is optional. *Product Development Corporation.*

CIRCLE (5) ON THE REPLY CARD

Automatic Pipe Tongs. C. A. Mathey Machine Works has introduced new automatic release pipe tongs for safer, faster, and easier pipe handling. Pipe is released automatically when weight is slacked off. No one needs to be near the tongs to manually release them. Tongs are ideal for manufacturers of steel and cast iron pipe, and for pipe storage facilities where many miles of pipe are handled monthly. The 8-in. Mathey Tongs illustrated has been proven, thoroughly field tested on 800 miles of takeup, equivalent to 100,000 lifts and releases. Rugged in construction the tongs will withstand the hard service required by pipeliners. Tongs are available in complete range of standard pipe sizes from 4 to 36-in. *C. A. Mathey Machine Works, Inc.*

CIRCLE (6) ON THE REPLY CARD

Mass Spectrometer. Consolidated has announced a new Mass Spectrometer that has been developed to provide an accurate but inexpensive, small-size model for industrial applications. Unit is of modular construction featuring unusual portability and permitting industrial engineers to perform precise batch or process analysis in the field or in the plant. Highly dependable and stable, the 2-611 unit will accurately analyze extremely small amounts of gases, gaseous mixtures, or volatile liquids. Overall mass range of the instrument is from 2 to 80 with resolving power adequate for separation of adjacent peaks up to about mass 35. Instrument has exceptional reproducibility of results. Its high sensitivity makes possible the detection of gas impurities in the low p. p. m. range. Flexible modular design permits the analyzer (vacuum) module to be separated from the control (electronics) module. *Consolidated Electrodynamics Corporation.*

CIRCLE (7) ON THE REPLY CARD

Platform Trailers. Designed to meet heavy-duty hauling demands, the Great Dane platform trailers will haul heavy loads to state legal limits trip after trip. Tandem and single axle models feature straight, two-member trussed frame that apply the soundly engineered bridge-truss principle for positive assurance of strength. All-welded construction, assures a durable unit that is ready for all hauling conditions. Other features include an upper 5th wheel plate that is welded to the frame and cross members in a new method that provides unusual rigidity ahead of the landing gear. The two-speed Binkley side-mounted steel landing is strongly braced to the cross members and a longitudinal header. Stake pockets —full size—are outside mounted on 36-in. centers with a steel rub rail on sides and rear. The Hutchens H-700 Tandem is standard and features non - lubricated equalizer bearings, positive axle alignment through adjustable torque rod on each axle, progressive type spring hanger brackets, die formed weldment construction. *Great Dane Trailers.*

CIRCLE (8) ON THE REPLY CARD

New Equipment

Epoxy Resin Cement. New aluminum filled epoxy resin cement, flexibilized for shock resistance, and to give superior repairs on joints, caulks, and bonded sur-

faces has been developed by Smooth-On Manufacturing Company. Being marketed in self-metering tubes to give additional convenience and economy in its numerous applications, Metal set A4, a resin-catalyst system, comes packed in two collapsible tubes. Proper proportions of resin and the low-toxicity catalyst are accurately measured by squeezing out identical lengths of material from each tube. Compound can be used for smoothing and caulking, as a patching material for leaking tanks, pipe, conduit, etc. Is completely water and oilproof, resists acids and alkalis, and is non-flammable. Can be applied to vertical surfaces without sagging and does not lose this quality even after extended storage. Following additions of the catalyst, material hardens at room temperature, or for quick repairs with addition of slight heating. Finished repairs can be machined by conventional methods to a feather edge and will withstand considerable mechanical shock due to flexibility of the compound. *Smooth-On Manufacturing Company.*

CIRCLE (9) ON THE REPLY CARD

Space Heater Controls. Designed specifically for the small space heater market, the

new General Controls G-20 series controls are self-contained with matching dimensions and mounting requirements and permit interchangeability without altering original connections. Manufacturer and servicemen alike can offer complete choice of control functions desired from four models which range from deluxe G-24 with combination modulating and snap, hi-lo-off type thermostat and the exclusive Hi Fire Ignition to the G-21 economy model with manual gas cock and hi-lo-off burner control. All models are available with coiled or straight sensing bulb. *General Controls Company.*

CIRCLE (10) ON THE REPLY CARD

Portable Power Pump. New, portable high-pressure hydraulic power pump de-

signed for two-speed, fast-approach operations has been introduced by Greenlee. No. 798-AC-SA Power Pump, is driven by a ¾ hp, 115-230-v electric motor, and will handle a wide variety of hydraulic power applications including benders for pipe and conduit. Unit can operate a hydraulic ram or jack three to five times faster than a hand pump. As the ram load increases, the pump will automatically change over to high-pressure. Capable of working at a continuous pressure of 6000 psi, the pump can develop up to 10,000 psi intermittent pressure. Unit is also available powered by an ac-dc universal electric motor or a 4-cycle gasoline engine. All models are offered with 4-way valve for two-direction action to provide both hydraulic advance and return of the ram. *Greenlee Tool Company.*

CIRCLE (11) ON THE REPLY CARD

Filter for Higher Flow Rates and Lower Pressure Drops. A new high flow rate-low pressured drop filter cartridge, type PL, has been announced by Hilliard Corporation. Cartridge consists of a fine quality filter paper, impregnated with a heat stabilizing resin, which is pleated, and cured at the stabilizing temperature. This extended surface-type filter is then formed around a metal center tube, and the end plates and a protective shield are attached by a special HILCO process. Ideal for full flow filter applications, cartridge will filter out particles down to 5 microns with continuous recirculation resulting in even finer filtration. Added advantage of higher flow rate with lower pressure drop results in obtaining smaller cartridge casings than those offered for lower flow rated filter cartridges. *The Hilliard Corporation.*

CIRCLE (12) ON THE REPLY CARD

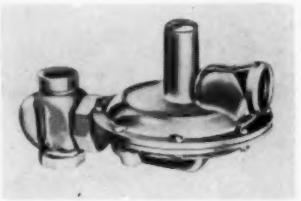
Meter Insulation Package. Gas meter insulation for use in conjunction with cathodic protection methods can be accomplished with the Universal insulating package. Package for one meter consists of the patented Universal meter nut, oil and gas resistant gasket, and galvanized malleable swivel. Each swivel has pilot or lip removed. Formerly a gas company had to furnish the swivels and remove the pilots. Straight swivels are stocked in pipe sizes ½-to 2-in. inclusive to fit Sprague, Metric and Rockwell meters. Insulating packages are also stocked containing insulating nut, gasket, and union tail piece (with lip removed) for all makes of meter bars having union connection on outlet end. Fully described by bulletin No. 522A and dimensional drawing No. 1200. *Universal Controls Corporation.*

CIRCLE (13) ON THE REPLY CARD

Teflon Gives Double Seal to Valves. New valve-seating arrangement, recently introduced by W-K-M division of ACF Industries, employs teflon, and achieves a double seal in valves handling petroleum products ranging from the heaviest viscous fluids to the lightest gases at pressures up to 5000 psi. A specially designed teflon seat insert makes possible the double seal. First seal occurs when the expanding gate and segment faces of the valve contact the teflon insert. The second seal is made by the gate and segment faces against the metal seat. Together, the teflon and metal seal ring provide a double-tight seal, both upstream and downstream. The self-lubricating teflon insert provides a slick—smooth surface for the gate and segment to glide across. It compresses when the gate and segment expand in the open or closed position. The teflon insert will not flow; is immune to acids, alkalis, and petroleum fractions; will not vulcanize and never requires lubrication. Standard on all oil field valves through 4-in., rated up to 5000 psi, the teflon inserts are available for larger size valves. Seats with teflon inserts can also be installed in W-K-M valves now in service. *W-K-M Division ACF Industries, Incorporated.*

CIRCLE (14) ON THE REPLY CARD

Relief Regulators. American Meter Company introduced a new series of domestic service regulations featuring an internal mechanical relief valve capable of



venting full line capacity should failure occur, preventing dangerous downstream pressures. Designated Reliance series 1413-A, new regulators are completely designed for ease of installation, and maximum safety under the most severe conditions. Union-type removable pipe section installs easily, with the regulator body swiveled at any angle to the pipe, requiring no alignment with the diaphragm section. Full relief regulators are also available with detachable meter bars on 6 and 11 ¼-in. centers where solid support of the meter is required. Wide range of models makes available a choice of exclusive and optional safety features. Extra large screened vent prevents freeze-ups and foreign matter from collecting on the diaphragm. Vents and vent caps are available in a variety of sizes and styles. High tensile strength, cast iron pipe section combined with light weight aluminum alloy bodies and tops assures rugged construction. *American Meter Company.*

CIRCLE (15) ON THE REPLY CARD

PROFESSIONAL DIRECTORY

Engineers, Designers and Manufacturers of
LP-GAS STAND-BY PLANTS
and special equipment for every requirement

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No Electrolysis

with **MAYCO** dielectric couplings and unions!

STRAIGHT & REDUCING COUPLINGS

SOLDER & FLARE COPPER UNIONS

Install MAYCO Nylon Insulated Dielectric Fittings. They give positive protection, inexpensive enough for every job. Proven by the millions — able to withstand 230° F. and pressures up to 1000 lbs. Ask your jobber or write direct to us.

MAY COMPANY
GALESBURG, ILLINOIS
Makers of famous MAYCO Nylon Dielectric Bushings

New HIGH·····POWER ·····TORQUE Air MOTORS

. . . ample power to rip through tough roots and earth formations . . . full speed and torque right up to stalling point . . . safer to operate than engine or electric drives.

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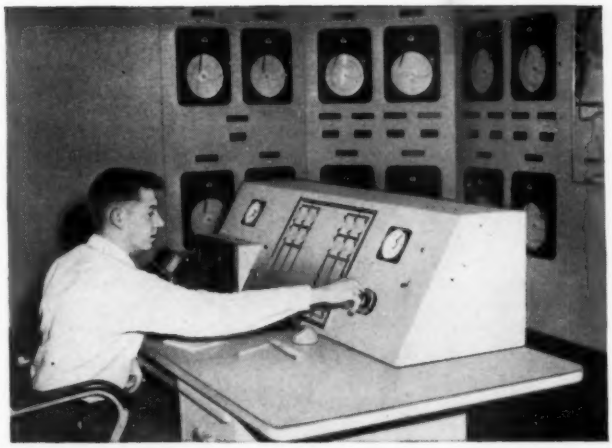

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Things to write for . . .

Bulletins, brochures, books of interest to gas utility industry people

Weather Forecasting Service. New, low-priced weather forecasting service, designed for easy interpretation by executives in weather-sensitive industries, is now being offered by Weather Trends, Inc., a weather consulting firm specializing in long-range forecasting. New monthly bulletins spotlight temperature and precipitation for the prospective month and include more general information for the following two months. Weather maps, in various colors, indicate at a glance what sections of the country are expected to be colder or warmer and wetter or drier than usual. More specific details are provided for each of seven climatological zones in the United States plus Canada. Free typical report. *Weather Trends, Inc.*

CIRCLE (61) ON THE REPLY CARD

Heavy Duty Gas Thermostat. New 4-page bulletin describes new heavy duty, high capacity gas thermostat for use in commercial and industrial equipment. Model "CST" thermostat is of the snap-acting type and is available in temperature ranges to 550 F. Unit is designed for use where quick response to temperature changes is required. In the ¾-in. size, it is rated at 133,700 Btu for manufactured gas, 198,000 for natural gas, and 42,000 for LP-Gas. *Robertshaw-Fulton Controls Company.*

CIRCLE (62) ON THE REPLY CARD

Safe Installation and Operation of Industrial Ovens and Dryers is described in Loss Prevention Bulletin No. 14.15 by Factory Mutual Engineering Division of the Associated Factory Mutual Fire Insurance Companies. This bulletin supersedes No. 14.46, "Suggested Oven Inspection Forms," 1938, and No. 11.39, "Safety Ventilation", 1946. A most comprehensive document covering every phase of the installation and operation of industrial ovens and dryers, the bulletin is divided into seven parts and includes the suggested procedures for oven manufacturers' application for acceptance by Factory Mutual, basic safety considerations for locations of industrial ovens and dryers, and construction of this type of equipment as well as sections on how to prevent fuel and vapor explosions; and procedures to follow for safety tests on equipment and controls. Bulletin reflects many basic principles set forth as a proposed standard in AGA Information Letter 70A, January 1957, "AGA Recommended Good Practice Requirements for Installation of Gas Equipment on Industrial and Commercial Premises." *Factory Mutual Engineering Division.*

CIRCLE (63) ON THE REPLY CARD

"Warm Floor" Blower. 1957 Quaker oil heater line features new exclusive automatic "Warm Floor" Blower that introduces new standard of automatic heating comfort for the home. Unit turns itself on and off automatically and circulates one-third more heated air than ordinary heater blowers or fans. Complete description, specifications, etc. on the complete 1957 Quaker oil heater line are available on request. *Quaker Manufacturing Company.*

CIRCLE (64) ON THE REPLY CARD

Study of Alternate High-Btu Gas Source published by IGT. Recent publication of a report by the Institute of Gas Technology notes that long-range planning by the utility gas industry must consider alternate sources of high-Btu gas, even though large reserves of natural gas are assured. Availability and cost of natural gas at the point of consumption, rather than total gas reserves should be the criterion by which natural gas substitutes are judged. Such substitutes, primarily for peak load purposes, have been produced by gasification of oil and other liquid hydrocarbons.

However, they must ultimately be derived from coal, the most plentiful and widely distributed of the fossil fuels. None of the present gasification processes can convert the entire coal substance into 800-900 Btu gas. The coal to gas conversion involves at least two process steps, one for coal gasification to produce a synthesis gas (mostly carbon monoxide and hydrogen) and the other for upgrading gas by methanation. Development of the first step process with a method that is independent of the quality or ash content of the coal has been completed by the IGT. Results of the study, sponsored by AGA, have been published in the IGT Research Bulletin No. 7, "Gasification of Pulverized Coal in Suspension," by C. G. von Fredersdorff, E. J. Pyrcioch, and E. S. Pettyjohn.

CIRCLE (65) ON THE REPLY CARD

Throttling Type Thermostat. Robertshaw-Fulton Controls Company has issued a new bulletin describing its heavy duty high capacity gas thermostat, Model DG. Capacity of the throttling-type temperature control in the ¾-in. size is 145,600 Btu for manufactured gas, 215,500 for natural gas, and 455,800 for LP-gas. Thermostat is available in temperature ranges up to 700 deg F. Six detailed diagrams and drawings are contained in the four-page bulletin. *Robertshaw-Fulton Controls Company.*

CIRCLE (66) ON THE REPLY CARD

Superheat Burners. Selas has a new bulletin available that describes their Superheat Burners which produce high heat release to localized areas of workpieces. The burners extend the possibilities and increase the effectiveness of selective open heating for flame hardening, flame annealing, brazing and soldering, heating for hot working, curing plastic coatings, making glass fibers, fire polishing glassware, preheating, spot-heating, and flash cleaning. Burners use only commercial fuel gas and air—with no bottled oxygen, yet can frequently replace oxy-gas tips to cut operating costs by 10 to 1 or more. Gas and air are burned under pressure to produce flame temperatures up to 3000 deg F and blast velocities to 2500 ft/sec. *Selas Corporation of America.*

CIRCLE (67) ON THE REPLY CARD

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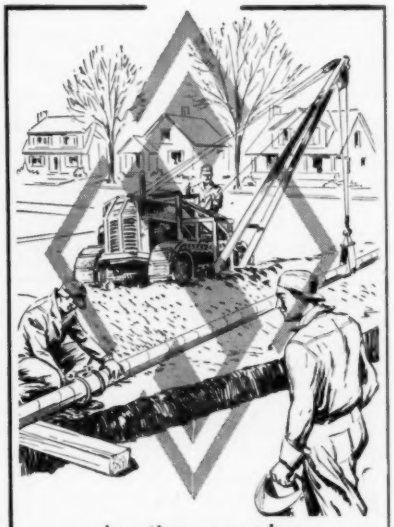

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Binder Catalog. All-new 116 page, loose-leaf binder and sales presentation catalog lists over 2500 stock items and has a special price schedule for hundreds of made-to-order binders. Also included is a 12-page section covering loose-leaf planning, ideas for increasing office efficiency and sales effectiveness; and special sections dealing with sales tools, custom-made products, advertising specialties, business gifts, and visual aids. In preparation for two years, the catalog shows many binders and presentation designs for the first time. *Elbe File & Binder Company, Inc.*

CIRCLE (68) ON THE REPLY CARD

Gaseous Fuels Combustion Study. Utilization of gas as a source of energy is inextricably linked with the combustion processes and developments in the combustion field have been greatly accelerated with the advent of jet propulsion. Many of these developments are of direct interest and possible application to the gas industry. Under the sponsorship of PAR Plan of the AGA, the Institute of Gas Technology, affiliated with the Illinois Institute of Technology, has conducted an exhaustive search of the literature on the theory of combustion, combustion phenomena, experimental investigations of various phases of combustion, and certain fundamentals important to burner design. Results of this study are published in the IGT Research bulletin No. 15, "Fundamentals of Combustion of Gaseous Fuels—A Critical Literature Review," by S. A. Weil, R. T. Ellington, E. F. Searight and S. Hu. *Institute of Gas Technology.*

CIRCLE (69) ON THE REPLY CARD

Doubled Inlet Pressure Tables. Revised size, capacity, and weight tables, necessitated by doubling of maximum inlet pressure of Rockwell "120" sensitive regulators, are included in newly revised four-page bulletin No. 1044, Rev. 6 issued by Rockwell. Maximum inlet pressure of the "120" line, designed for large appliances, industrial furnaces, and gas engines, has been increased from 5 to 10 psi by replacing leather seal diaphragm with one of special synthetic material. Capacity tables in new bulletin make allowance for the fact that capacity is no longer limited to amount of gas passed at a 1 psi inlet-outlet differential. Differentials up to 10 psi may now be used, provided the control tube is taken downstream. *Meter and Valve Division, Rockwell Manufacturing Company.*

CIRCLE (70) ON THE REPLY CARD

Electric Generating Plant "Blue Book." General information concerning the selection of engine driven electric generating plants has been revised and is now available in a new "Blue Book." The pocket sized booklet traces history of electric plant development from the early stages where storage batteries were necessary to today's modern single-unit, engine-generator power plants. Three general groups of electric plants are described in easy-to-understand language. Plant operation for each type is thoroughly discussed. Also reviewed are three types of prime movers that furnish mechanical power for driving the generator, namely: gasoline, diesel, and gas engines. Cost of operation and installation of each type is discussed. Engine cooling differences are compared and starting methods described. *D. W. Onan & Sons Inc.*

CIRCLE (71) ON THE REPLY CARD

Omnibus Template Kit. 1957-58 catalog of 100 rigid vinyl templates for all specializations is now available from A. Lawrence Karp. Included is a description of a comprehensive new kit of five templates that covers the most complete range of AISC and CRSI detailed profiles yet assembled for fabricators and users of structural steel and reinforced steel. Common but complex symbols of steel/concrete construction in industry, housing, transportation, utilities, and public works are available on 5⅜ by 9⅞ in. templates. Four of the five templates in the kit cover aspects of wide flange steel detailing in ⅛, ¼, ½, and 1-in. scales: Steel beam, column and pipe shapes, channels, joists, angles, removable concrete forms, rivet spacing scales and angle legs — even in junior sizes. Fifth template includes bar bends and hooks, bar size sections, concrete forms, stirrup bends, etc. *A. Lawrence Karp.*

CIRCLE (72) ON THE REPLY CARD

Gas Utility BOOKSHELF

Gas Requirements and Supplies of the Gas Utility and Pipeline Industry, *published by Bureau of Statistics of American Gas Association, 420 Lexington Avenue, New York 17, New York. Price, $2.00.*

A new analysis of the future gas requirements and supplies of the industry, this publication covers annual supplies and requirements between 1956 and 1960, as well as the peak day in the heating seasons from 1956-1957 to 1960-1961. For each class of service it shows the anticipated requirements and available supplies from various sources to meet these requirements. Estimates of future needs for steel pipe and other construction materials are also shown, as well as anticipated industry construction expenditures. Detailed statements indicating the relative importance of underground storage facilities in meeting industry requirements are included. Data is shown for each of 10 geographical areas of the country.

Materials Handling Equipment, *by D. Oliphant Haynes, published by Chilton Book Division, 56th & Chestnut Streets, Philadelphia 39, Pennsylvania. Pages, 636. Price, $17.50.*

Complete story of machines and systems, what they do and how they do it. Materials handling is an important factor in manufacturing cost — estimated at 25 percent or more of the cost of production. Book presents fundamental basis for planning of operations, notes new equipment to consider, and overall systems to compare. Topics include basic types of equipment and their capabilities, unit-load handling, in-process handling, integration of production machinery with handling equipment, package handling, techniques for analyzing specific problems, analysis and design of handling systems, cost analysis, and organization and control of handling systems. There are over 2,200 especially drawn illustrations for this book.

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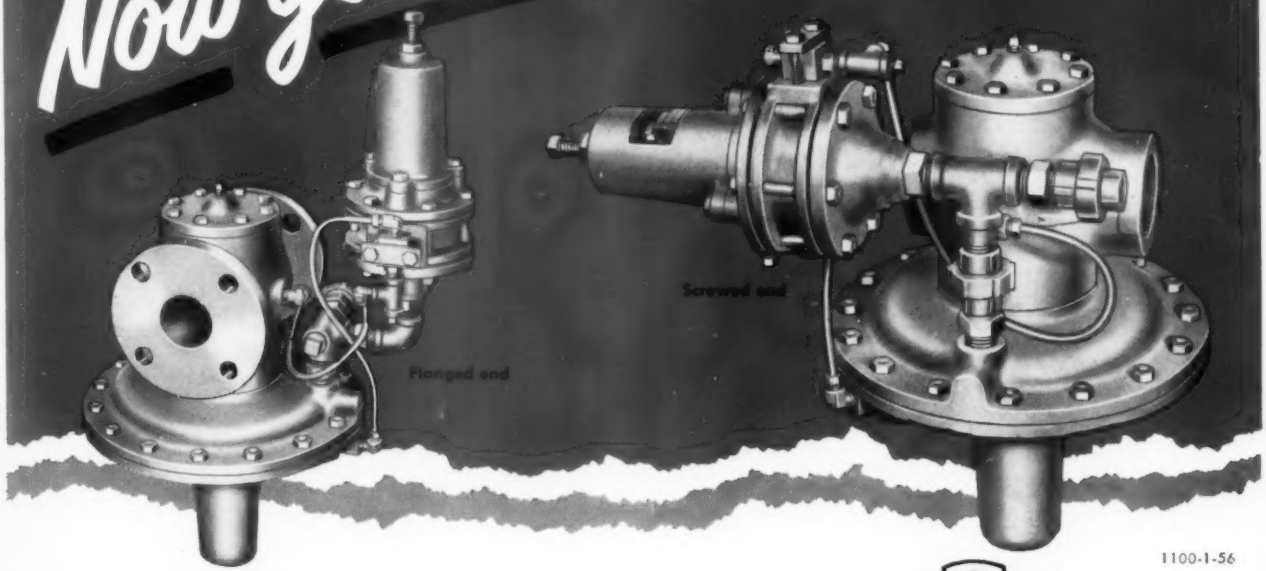

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